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FINAL

Theater Ballistic Missile Targets  
Programmatic Environmental Assessment



Vandenberg Air Force Base, California

December 1997

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REPLY TO  
ATTENTION OF

DEPARTMENT OF THE ARMY  
U.S. ARMY SPACE AND MISSILE DEFENSE COMMAND  
POST OFFICE BOX 1500  
HUNTSVILLE, ALABAMA 35807-3801

11 DEC 1997

CSSD-EN-V (200)

MEMORANDUM FOR Commander, CES/CEV, 806 13th Street,  
Suite 116, Vandenberg Air Force Base,  
CA 93437-5242

SUBJECT: Theater Ballistic Missile Targets Environmental  
Assessment (EA) and Finding of No Significant Impact (FNSI)

1. The final EA is complete with all comments incorporated or successfully resolved. The EA was prepared to assess potential impacts of launching theater target missiles from various sites on Vandenberg AFB in support of future military service exercises.
2. Enclosed are five copies of the final EA and FNSI for your approval, signature, and release to the public.
3. A revised version of the Coastal Consistency Determination will be forthcoming under separate cover.
4. The point of contact for this action is David C. Hasley, DSN 645-4170 or commercial (205) 955-4170.

Encl

*Craig R. Robison*  
LARRY D. McCALLISTER LTC

LTC, EN

Acting Deputy Chief of Staff,  
Installations, Logistics,  
and Environment

**FINDING OF NO SIGNIFICANT IMPACT  
PROGRAMMATIC ENVIRONMENTAL ASSESSMENT FOR THE  
THEATER BALLISTIC MISSILE TARGETS PROGRAM  
AT VANDENBERG AIR FORCE BASE, CALIFORNIA**

This environmental assessment (EA) analyzes the environmental impacts of launching up to 30 target missiles per year from Vandenberg Air Force Base (AFB) using mobile launchers and one fixed rail launcher. Both solid- and liquid-fueled target missiles are under consideration.

**PURPOSE AND NEED:** The purpose of this proposed action is to expand the capabilities of the Western Range to provide launches of small, mobile theater, and larger rail-launched targets from Vandenberg AFB to be intercepted over the open ocean of the Western Range off the California coast.

Expanded target launch capabilities need to be available at Vandenberg AFB to support future Navy, Air Force, and Army operations in the Western Range. Flight tests are needed to provide targets to fully validate system design and operational effectiveness of theater defensive missiles and other defense systems utilized by the various services in the Department of Defense.

**DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES:** The proposed action is to expand the launch capability at Vandenberg AFB to support future Navy, Air Force, and Army missile testing operations in the Western Range. These operations include realistic test situations for intercepts by defensive missile systems. Up to approximately 30 target launches per year are anticipated. An average of five launches could occur every 2 months, with up to five launches occurring in a 3-day period for a particular exercise. Some launches may occur simultaneously. No major construction would be required. There would be no overflight of the islands off the coast of California.

The U.S. Army Space and Missile Defense Command (USASMDC), in cooperation with Vandenberg AFB, proposes to launch small liquid and solid propellant theater ballistic missiles (TBMs) from mobile launchers on several sites on Vandenberg AFB. Examples of these missiles include the Lance (and Lance-like missiles), HERMES, PATRIOT as a Target (PAAT), and sounding rockets. Larger target missiles, such as the Hera, Storm, and ARIES, would be launched from an existing rail launcher to be located at Space Launch Complex (SLC)-5.

The target missiles and sounding rockets could be launched from mobile launchers and existing launch pads at any of the following locations:



■ North Vandenberg AFB

- Group A: Launch Facility (LF)-06, LF-07, LF-09, LF-25, LF-26
- Group B: LF-21, LF-22, LF-23, LF-24
- Group C: Test Pad 01; Rail Garrison Peacekeeper; Advanced Ballistic Re-entry System (ABRES) A, sites 1, 2, and 3; 576-E

■ South Vandenberg AFB

- Group D: SLC-3W, SLC-5
- Group E: V-33

Defensive missile systems would be launched from aboard ships, aircraft, or ground sites as analyzed in the Theater Missile Defense (TMD) Extended Test Range Environmental Impact Statement (EIS). Flight testing requires collection and analysis of flight data by means of optical sensors, telemetry receivers, and radar. Most of the data collection systems are existing and would not need to be constructed to support theater missile testing.

In addition to the proposed action alternative, the no-action alternative was evaluated. The no-action alternative is to continue current operations at Vandenberg AFB and the Western Range without adding the capability to launch theater ballistic missile targets and participate in intercept operations.

**BACKGROUND:** Pursuant to the Council on Environmental Quality regulations for implementing the procedural provisions of the National Environmental Policy Act (40 CFR 1500-1508), Department of Defense Directive 6050.1, the USASMDC has conducted an EA of the potential environmental consequences of expanded target missile launch capabilities at Vandenberg AFB, California.

The TMD Extended Test Range EIS, completed in November 1994, analyzed the impacts of launching target missiles from ships located in the Pacific Ocean and interceptor missiles launched from various launch sites on Vandenberg AFB and the associated Western Range Candidate Test Area. However, the Record of Decision signed on 21 March 1995 did not select Vandenberg AFB as a site for TMD testing because sea-launch capabilities were not available. Vandenberg AFB is now being considered for launches of small, TBM, mobile-launched targets and larger rail-launched target missiles.

**SUMMARY OF THE ANTICIPATED ENVIRONMENTAL IMPACTS:** To assess the significance of a decision to expand the target launch capability of Vandenberg AFB, the affected environment and all activities with the potential for causing environmental impacts were

identified. Twelve broad environmental resources were evaluated to determine the potential effects of the proposed action. The 12 broad environmental resources include, as appropriate: air quality, airspace, biological resources, cultural resources, geology and soil quality, hazardous materials/waste, health and safety, infrastructure, land use, noise, socioeconomics, and water resources. Launches of small target missiles from mobile launchers would result in a potential for impacts similar to or less than those discussed in the TMD Extended Test Range Final EIS for airspace, geology and soils, infrastructure, socioeconomics, and water resources. Impacts were determined to be not significant in the EIS for these resources; therefore, these resource areas were not reevaluated in this EA.

The results of this analysis were based upon the estimation of potential environmental consequences of up to 30 target missile launches per year occurring on Vandenberg AFB. An average of five launches every 2 months, with up to five launches in a 3-day period for a particular exercise, were assessed.

**Air Quality.** Santa Barbara County does not meet federal and state air quality standards for ozone and PM-10 criteria pollutants. Emissions of ozone precursors, nitrogen dioxide, and volatile organic compounds (VOCs) are of great concern to the Santa Barbara County Air Pollution Control District (SBCAPCD). Launch and pre-launch support activities, while not yet defined in detail, would likely result in low emissions of VOCs from activities such as use of cleaning solvents, oil and lubricants, and paints or thinners. Launch preparation and support activities would likely require some air quality permits and associated mandated offsets. The emissions would be regulated in accordance with the existing Memorandum of Agreement between the SBCAPCD and Vandenberg AFB. An air quality conformity analysis has been completed and a conformity determination is not required.

**Biological Resources.** No construction or overflight activities are proposed that would impact vegetation, wildlife, endangered species, water quality or wetlands. Impacts that can result from launch-related activities include debris impacts, launch noise, sonic booms, and missile emissions. Launch scheduling will be coordinated with wildlife agencies to minimize disruption to the pinniped pupping season and to roosting or nesting sites of sea birds. Launches will avoid overflights of Points Arguello and Pedernales if possible, specifically during the nesting season. Night launches will be avoided where possible, however, some missions may require night time or early morning (predawn) launches in order to accomplish specific mission objectives. On site monitoring will be conducted for specific areas of concern as determined by Vandenberg AFB, the National Marine Fisheries Service, and the U.S. Fish and Wildlife Service and in accordance with the mitigation and monitoring set forth in the Programmatic Marine Mammal Take Authorization submitted by Vandenberg AFB

**Cultural Resources.** Ground disturbance would only occur as a result of debris strikes from a missile failure or flight termination, and off-road recovery of debris items. Program activities to reduce the potential for environmental impacts have been included as part of the proposed action. These activities include training of personnel, limiting the off-road recovery of debris, and consultation with the State Historic Preservation Officer and The Advisory Council on Historic Preservation.

**Hazardous Materials and Hazardous Waste.** Hazardous materials and hazardous waste generation from the proposed action would not increase substantially from current operations. Procedures and materials storage and disposal infrastructure at Vandenberg AFB are sufficient to accommodate all hazardous waste produced by the proposed test operations. The current system for storage, handling, and disposal of hazardous materials at Vandenberg AFB is capable of meeting the requirements of hazardous materials and hazardous waste without incident.

**Health and Safety.** Health and safety issues associated with the proposed action involve hazardous emission products, explosive safety, and transportation safety for TBM systems. The explosive devices and materials proposed for use with target missile operations are very similar to those currently in use at Vandenberg AFB. Implementation of standard safety procedures and reviews that are similar to current operations would serve to reduce the potential for explosive hazards.

To provide protection for mission-essential personnel, all launch activities would require the base to establish a Launch Hazard Area (LHA) for each flight test mission. The LHA provides a designated area from which personnel are cleared based on potential hazards from any missile debris that may result from launch or near-launch activities. The LHAs for some proposed launch sites may extend beyond the Vandenberg AFB boundaries. Landowner agreements exist which permit control of these areas during launch activities. Implementing the LHA procedures allows for protection of the population that could be affected by the launch and minimizes hazards associated with unplanned flight termination. Impact zones for successful or unsuccessful intercepts would be completely over open sea waters or contained within the limits of the Western Range Area.

**Land Use.** The use of existing Vandenberg AFB facilities to launch target missiles would not change the overall land use and management of the base. Potential impacts to off-site land use (coastal access, recreation, commercial and sport fishing industries) may occur under conditions where LHAs for each flight test mission extend outside the boundaries of Vandenberg AFB. These impacts can be minimized by scheduling launches during weekdays and with sufficient notice of offshore LHAs so that fishing boats can schedule their trips to avoid the LHA. Closure

of Jalama Beach is not under consideration for any of the proposed launches.

**Noise.** The proposed action includes provisions to launch up to 30 target missiles per year. At close distances, maximum noise levels for some types of missiles exceed the levels allowable by the Occupational Safety and Health Administration. These maximum sound pressure levels would last for several seconds and then quickly taper off as the launch vehicle moves away. Personnel with exposure to noise would be required to wear hearing protection (ear plugs) and follow established procedures to reduce noise exposure.

**FINDINGS AND CONCLUSION:** The resulting environmental analysis shows that no significant impacts would occur from the proposed TBM Targets testing program. Based upon the information contained within this assessment, a Finding of No Significant Impact is made. The preparation of an EIS, therefore, is not required.

**POINT OF CONTACT:** Submit written comments or requests for a copy of the Theater Ballistic Missile Targets Program EA to:

Vandenberg Air Force Base  
30<sup>th</sup> Space Wing Environmental Management Office  
ATTN: Environmental Coordinator  
806 13<sup>th</sup> Street, Suite 116  
Vandenberg AFB, CA 93437-5242

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<p>This EA documents the results of an analysis of the potential for and magnitude of impacts from launching liquid and solid propellant target missiles from Vandenberg Air Force Base. The proposed action includes up to 30 target missile launches per year from existing launch sites on the base using mobile launchers and one fixed rail launcher.</p> <p>The EA analyzes the environmental consequences of the proposed action and alternatives. The areas of environmental consideration are air quality, airspace, biological resources, cultural resources, geology and soils, hazardous materials and waste, health and safety, infrastructure, land use, noise, socioeconomics, and water resources. No significant impacts have been identified. No cumulative impacts are expected.</p>					
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## Executive Summary

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# EXECUTIVE SUMMARY

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## Introduction

The Western Range comprises a broad area of the Pacific Ocean off the coast of Vandenberg Air Force Base (AFB), California. Functioning as the test area for space and missile operations, the range includes a network of tracking and data gathering facilities.

The Theater Missile Defense (TMD) Extended Test Range Final Environmental Impact Statement (EIS), completed in November 1994, analyzed the impacts of launching target missiles from ships located in the Pacific Ocean and interceptor missiles from various launch sites on Vandenberg AFB and the associated Western Range Candidate Test Area. However, the Record of Decision signed on 21 March 1995 did not select Vandenberg AFB as a site for TMD testing because sea-launch capabilities were not available and additional test instrumentation would be required. Vandenberg AFB is now being considered for launches of small, liquid and solid propellant, mobile theater ballistic target missiles, such as the Lance, HERMES Target System, PATRIOT as a Target (PAAT), Black Brant IX, Two-stage (or DR-2) Terrier, Terrier/Orion, Castor I, and STRYPI II, and larger rail-launched missiles such as the Storm, ARIES, and Hera target missiles. Details of these missile systems are provided in section 2. The base offers a large area of operation, has a proven safety record, and provides the capability to perform a wide range of missile intercept testing. Target launch capabilities need to be added to allow Vandenberg AFB to support U.S. Navy, U.S. Air Force, and U.S. Army operations in the Western Range. This Environmental Assessment (EA) analyzes the impacts of launching target missiles from various sites on Vandenberg AFB with intercepts by defensive missiles over open ocean areas and will summarize, where applicable, the conclusions reached in the TMD Extended Test Range EIS.

## Test Program Activities

The missiles proposed for use as targets have already undergone flight testing and are currently available.

The small target missiles could be launched from mobile launchers located at any of the following locations on Vandenberg AFB:

- North Vandenberg AFB
  - Group A: Launch Facility (LF)-06, LF-07, LF-09, LF-25, LF-26
  - Group B: LF-21, LF-22, LF-23, LF-24
  - Group C: Test Pad-01; Rail Garrison Peacekeeper; Advanced Ballistic Re-entry System (ABRES) A, sites 1, 2, 3; 576-E

- South Vandenberg AFB
  - Group D: Space Launch Complex (SLC)-3W, SLC-5
  - Group E: V-33

Larger missiles, such as the Hera target, would be launched from a 50k rail launcher located on SLC-5. Expanding the target launch capability of Vandenberg AFB would provide realistic test situations for intercepts by defensive missiles. Up to approximately 30 launches are planned per year. An average of five launches would occur every 2 months, with up to five launches occurring in a 3-day period for a particular exercise. Since the 50k rail launcher would be installed on an existing concrete pad or within a previously graded or graveled area in which construction of a concrete pad could be required, only minor construction would be necessary. There would be no overflights of the islands off the California coast.

Missiles involved in operations would include both targets and interceptors. The target missiles would consist of both liquid and solid fuel propulsion systems. Typical interceptors that could be considered include, but are not limited to, the Army's Theater High Altitude Area Defense (THAAD), the PATRIOT Advanced Capability (PAC)-2 and PAC-3, Corps Surface-to-Air Missile (SAM); the Navy Standard Missile 2 (SM-2), Block III or IV-A; and the Air Force theater ballistic missile currently under development. These interceptors have been evaluated in the TMD Extended Test Range EIS and other environmental documents. Defensive missiles would be launched from aboard ships or aircraft or from ground sites.

Preflight test activities would include transportation of the missiles to Vandenberg AFB by aircraft, rail, or over-the-road trucks, temporary storage of the missiles, and installation of the 50k rail launcher and, where necessary, launch pad. Flight test activities would include actual launches of the target missiles, evacuation of the flight trajectory and impact debris areas, and support by optical sensors, telemetry receivers, and radar.

## **Methodology**

The purpose of this EA is to analyze the potential environmental consequences of the proposed action testing activities in compliance with the National Environmental Policy Act; Department of Defense Directive 6050.1, Environmental Effects in the United States of Department of Defense Actions; Air Force Instruction 32-7061, The Environmental Analysis Process; and Army Regulation 200-2, Environmental Effects of Army Actions.

In order to provide a context for understanding the potential effects of the proposed action and a basis for assessing the significance of potential impacts, 12 areas of environmental consideration were examined: air quality, airspace, biological resources, cultural resources, geology and soils, hazardous materials and waste, health and safety, infrastructure, land use, noise, socioeconomics, and water resources. To assess the significance of any impact, a list of activities necessary to accomplish the proposed action was developed. The affected environments at the candidate launch locations were described. A proposed activity was analyzed in greater detail if a potential for causing impacts was anticipated, and those activities with a potential for significant environmental consequences were



identified. Launches of small target missiles from mobile launchers would result in a potential for impacts similar to or less than those discussed in the TMD Extended Test Range EIS for airspace, geology and soils, infrastructure, socioeconomics, and water resources. Impacts were determined to be not significant in the EIS for these resources; thus, they were not reevaluated in this EA. The results are summarized in the following paragraphs.

**Airspace.** All launches, intercepts, and debris impacts would take place in either existing restricted area or warning area airspace that would be cleared of non-participating aircraft. The launches would be short-term events, after which joint-use airspace would be released to other users; scheduling would obviate impacts.

**Geology and Soils.** Spill prevention, containment, and control measures would prevent accidental spill impacts. Modeling results indicated no significant impact to soils from the deposition of such exhaust products as aluminum oxide ( $\text{Al}_2\text{O}_3$ ) or hydrogen chloride (HCl); theater ballistic missile (TBM) target exhaust amounts would be less than TMD Extended Test Range levels. Standard Operating Procedures (SOPs) would cover handling and disposal of burning solid propellant reaching the ground. Soil impacts from debris recovery would be minimal.

**Infrastructure.** It was determined that the use of existing housing facilities and a limited increase in traffic volume and transient personnel would have no adverse impacts. Air, rail, and marine traffic would not be affected; SOPs would cover any minimal impacts.

**Socioeconomics.** It was determined that the limited use of local restaurants and motels would have a positive effect on the economy and that the use of such accommodations during tourist season would have a very limited effect.

**Water Resources.** Spill prevention, containment, and control measures would prevent accidental spill impacts to water resources. The TMD Extended Test Range EIS indicated no significant impact to surface water from  $\text{Al}_2\text{O}_3$  or HCl deposition; TBM amounts would be less than TMD Extended Test Range levels. Water requirements for the proposed action did not represent a significant increase in usage.

## Results

This section summarizes the conclusions of the analyses made for each of the seven remaining areas of environmental consideration as based on the application of the described methodology.

**Air Quality.** Launch preparation and support activities and launches would potentially impact air quality. However, emissions from these activities would be regulated in accordance with the Memorandum of Agreement between Vandenberg AFB and the Santa Barbara County Air Pollution Control District.

**Biological Resources.** The possibility of a spill or other accident involving hazardous materials impacting sensitive habitat in the area is considered remote. Normal launch activities are not expected to substantially impact vegetation. Proposed activities would

not result in debris over land areas. The potential for vegetation to be impacted by HCl or other exhaust emissions from solid propellant target missiles is expected to be slight.

Sudden noises such as aircraft overflights, sonic booms, and missile launches cause variable reactions in wildlife. These noises may startle some wildlife species, such as marine mammals, and cause flushing behavior in birds. This startle reaction would be of short duration. Studies indicate that birds which flush during sharp, loud noises return to normal behavior within a short time. The altitude of the target missiles once they approach the coastline varies with each launch site, ranging from 251.7 meters (825.8 feet) to 4,782 meters (15,691 feet); the altitude would be of sufficient distance to minimize potential noise and visual disturbances to species that have a tendency to react more to visual than aural stimuli.

Personnel would avoid avian nesting and roosting areas and pinniped haulout areas (a location allowing entrance to or exit from the ocean). Pinnipeds are a suborder of carnivorous aquatic mammals, such as seals and walrus. Low-level, short-term exposure to the amount of HCl produced by the solid propellant target missiles during launch activities is not expected to adversely affect wildlife. The natural buffering capacity of sea water and the strong ocean currents would quickly neutralize the reaction to the limited release of nitric acid if a launch mishap of the Lance missile were to occur.

The first shot of each missile type would be monitored in close coordination with regulatory agencies at the request of the National Marine Fisheries Service. The results of this observation would determine the necessity of any future monitoring. On site monitoring will be conducted for specific areas of concern as determined by Vandenberg AFB, the U.S. Fish and Wildlife Service, and the National Marine Fisheries Service, and in accordance with the mitigation and monitoring set forth in the Programmatic Marine Mammal Take Authorization submitted by Vandenberg AFB. Launches from site 576-E will be restricted to the period from 1 October to 31 December to avoid breeding seasons for listed species. Night launches will be avoided where possible; however, some missions may require night or predawn launches in order to accomplish specific program objectives. Launches from Groups D and E will avoid overflights of Points Arguello and Pedernales if possible, specifically during nesting seasons.

**Cultural Resources.** The probability of debris, generated by launch mishap or flight termination, striking the ground where surface or subsurface archaeological deposits are located is remote. In the event of mishap debris impacting land areas of Vandenberg, a qualified archaeologist would accompany the debris recovery team. No impacts to historical structures are expected to result from noise-induced vibration. Personnel would be briefed on Federal regulations which protect cultural resources. Unexpected discovery of cultural resources during the course of missile testing would be reported to the Vandenberg AFB Environmental Division.

**Hazardous Materials and Waste.** The existing hazardous materials storage and handling capabilities at Vandenberg AFB are adequate to ensure that all materials are safely handled in accordance with applicable regulatory procedures. Liquid propellants would be loaded onto the Lance missiles at the manufacturing location, and then the missile would be

transported to Vandenberg AFB. The proposed action would not result in a substantial increase in the total quantities of hazardous waste.

**Health and Safety.** All target missile prelaunch operations involving explosive materials would require implementation of a written procedure that has been approved by the 30<sup>th</sup> Space Wing Safety Office and must be conducted under the supervision of explosive-certified personnel. Implementation of standard safety procedures, as well as the similarity to current operations, serve to reduce the potential for safety hazards. Explosive safety quantity-distances have been established around propellant handling and explosive storage facilities. Launch hazard areas and surface danger zones would be established around the mobile launchers and 50k rail launcher to minimize the potential for health and safety impacts during launches. To ensure immediate response and rapid control of the site in the event of an accident, Vandenberg AFB would maintain a stand-by emergency response team near the launch site.

**Land Use.** The use of existing Vandenberg AFB facilities would not change the overall land use and management of the base. Potential impacts to coastal access and recreation would be minimized by planning to launch on weekdays, with night and weekend launches as alternatives. Closure of Point Sal State Beach could potentially affect only nine individuals per hour during the busiest month (August) and as few as two individuals per hour in February, normally the least busy month, assuming the average daily number of visitors is evenly distributed over a typical 8-hour day. Jalama Beach will not need to be closed for any of the proposed launches.

**Noise.** During each launch, all non-essential personnel would be excluded from the launch area. Mission-essential personnel would be required to follow established procedures to reduce noise exposure, such as wearing ear plugs or evacuating to launch bunkers. The public would be excluded from areas where any exposure to harmful noise levels could occur.

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## Acronyms and Abbreviations

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# ACRONYMS AND ABBREVIATIONS

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30 SW/SE	30 <sup>th</sup> Space Wing Safety Office
ABRES	Advanced Ballistic Re-entry System
AFB	Air Force Base
Al <sub>2</sub> O <sub>3</sub>	Aluminum oxide
AR	Army Regulation
ATACMS	Army Tactical Missile System
BACT	Best Available Current Technology
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAP	Collection-accumulation point
CARB	California Air Resources Board
CFR	Code of Federal Regulations
CNEL	Community noise equivalent level
CO	Carbon monoxide
CO <sub>2</sub>	Carbon dioxide
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Program
dB	Decibel(s)
dBA	A-weighted decibels
DNA	Determination of Non-applicability
DOD	Department of Defense
DOT	Department of Transportation
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESQD	Explosive Safety Quantity Distance
EWR	Eastern and Western Range regulation
FTS	Flight termination system
HAP	Hazardous Air Pollutant
HAWK	Homing All-the-Way Killer
HCl	Hydrogen chloride
ICBM	Intercontinental ballistic missile

IRFNA	Inhibited red fuming nitric acid
L <sub>dn</sub>	Day-night average sound level
LF	Launch Facility
LHA	Launch hazard area
L <sub>max</sub>	Maximum sound level
MOA	Memorandum of Agreement
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NATO	North Atlantic Treaty Organization
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NO <sub>2</sub>	Nitrogen Dioxide
PAAT	PATRIOT as a Target
PAC	PATRIOT Advanced Capability
PM-10	Particulate matter less than 10 microns in diameter
PSD	Prevention of Significant Deterioration
PSM	Process Safety Management
ROI	Region of influence
RONA	Record of Non-Applicability
SAM	Surface-to-Air Missile
SBCAPCD	Santa Barbara County Air Pollution Control District
SIP	State Implementation Plan
SLC	Space Launch Complex
SM	Standard Missile
SO <sub>2</sub>	Sulfur dioxide
SOP	Standard Operating Procedure
SPL	Sound pressure level
TBM	Tactical ballistic missile
THAAD	Theater High Altitude Area Defense
TMD	Theater Missile Defense
UDMH	Unsymmetrical dimethyl hydrazine
USASMDC	U.S. Army Space and Missile Defense Command
USASSDC	U.S. Army Space and Strategic Defense Command
USFWS	U.S. Fish and Wildlife Service
VOC	Volatile organic compound

WIFTF  
WSMR

Wallops Island Flight Test Facility  
White Sands Missile Range

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## 1.0 Purpose of and Need for the Proposed Action

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# 1.0 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

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## 1.1 BACKGROUND

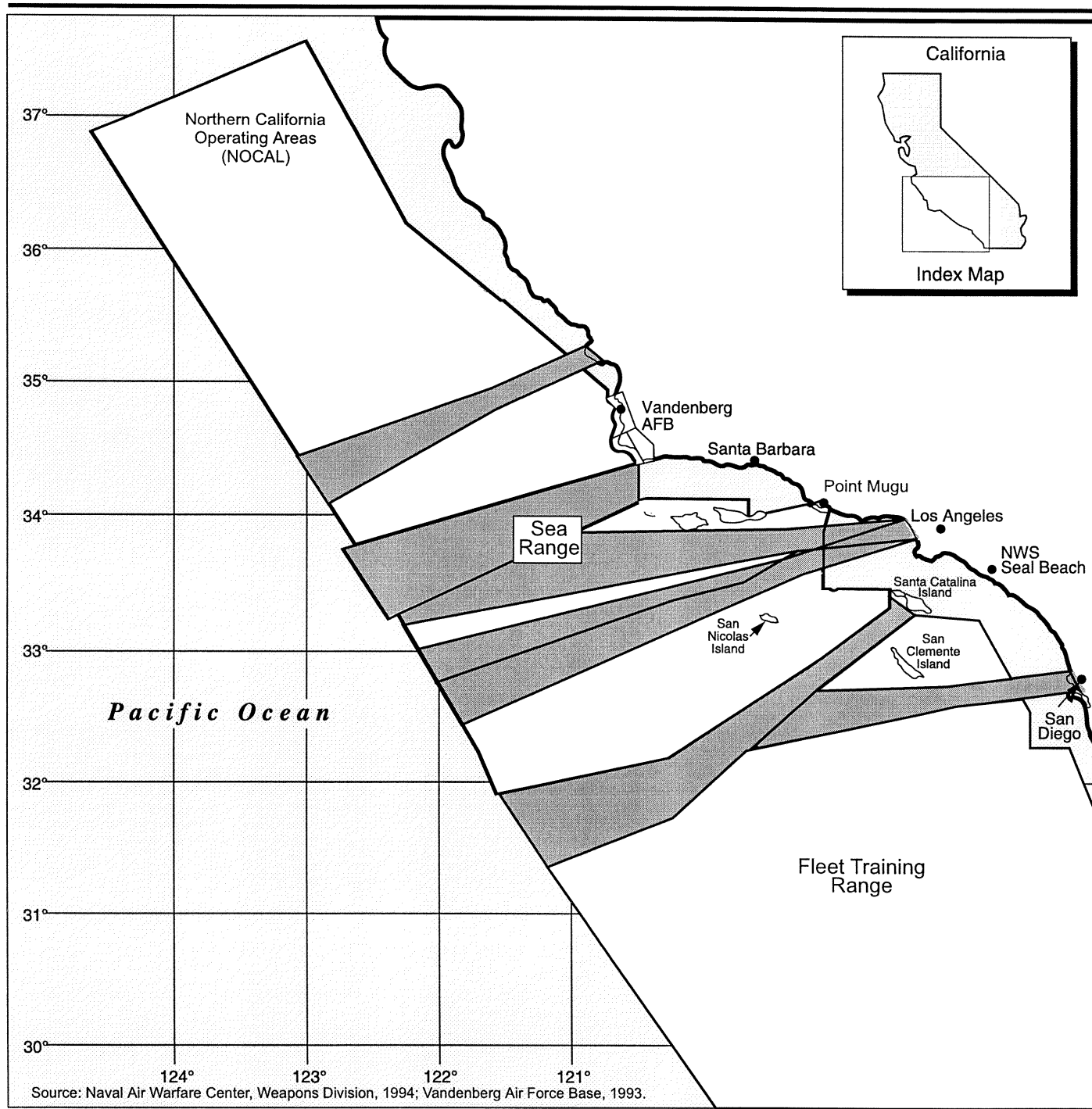
The Western Range (see figure 1-1) includes a broad area of the Pacific Ocean that extends west from Vandenberg Air Force Base (AFB), California. The range functions as the test area for space and missile operations, and includes a network of tracking and data-gathering facilities (supplemented by instrumentation on aircraft) throughout California, Hawaii, and the South Pacific. The Western Range supports U.S. Air Force, U.S. Army, U.S. Navy, and National Aeronautics and Space Administration (NASA) exercises and test activities. Only that portion of the range affected by a launch is usually activated. Activation consists of instructing ships and airplanes not to enter the affected area and either sheltering or evacuating people in the activated area.

The Theater Missile Defense (TMD) Extended Test Range Final Environmental Impact Statement (EIS), completed in November 1994, analyzed the impacts of launching target missiles from ships located in the Pacific Ocean and interceptor missiles from various launch sites on Vandenberg AFB and the associated Western Range Candidate Test Area. The Record of Decision signed on 21 March 1995 did not choose Vandenberg as a site for TMD extended range testing because sea-launch capabilities were not available and additional test instrumentation would be required. Vandenberg AFB is now being considered for launches of small, liquid and solid propellant, mobile theater targets, and for launches of larger rail-launched solid propellant target missiles. The missiles proposed for use as targets are currently available and have either been previously flight tested or flown as sounding rockets to acquire meteorological data. Vandenberg AFB offers a large area of operation, a proven safety record, and the capability to perform a wide range of missile intercept testing. Target launch capabilities need to be added to allow Vandenberg AFB to better support Navy, Air Force, and Army operations in the Western Range. This Environmental Assessment (EA) analyzes the impacts of launching targets from various sites on Vandenberg AFB with intercepts by defensive missiles over open ocean areas and will summarize applicable conclusions reached in the TMD Extended Test Range Final EIS.

## 1.2 PURPOSE AND NEED

### 1.2.1 PURPOSE

The purpose of this proposed action would be to expand the capabilities of the Western Range to provide launches of small, mobile theater, and larger rail-launched targets from Vandenberg AFB to be intercepted over the open ocean of the Western Range off the California coast.



# EXPLANATION

- Test Range Area
- Air Traffic Corridors

## Western Range Area Location

Air Traffic Corridors,  
Vandenberg AFB

**Figure 1-1**



0 6 120 Kilometers  
0 40 80 Miles

### 1.2.2 NEED

Target launch capabilities need to be added to Vandenberg AFB to allow it to better support Navy, Air Force, and Army operations in the Western Range. Flight tests are needed to provide targets to fully validate system design and operational effectiveness of theater defensive missiles and other defense systems utilized by the various services in the Department of Defense (DOD).

## 1.3 DECISIONS TO BE MADE

The decision to be made by the Vandenberg AFB Commander, supported by information contained in this EA, is whether to establish capability at the Western Range for launching small, mobile theater, and larger rail-launched TMD target missiles from various locations on Vandenberg AFB in support of defensive missile testing.

## 1.4 RELATED ENVIRONMENTAL DOCUMENTATION

Related National Environmental Policy Act (NEPA) documentation previously prepared includes the following:

Naval Ordnance Missile Test Station, Facilities Engineering Department, *Environmental Assessment for Standard Missile*, White Sands Missile Range, New Mexico.

PATRIOT Project Office, 1990. *PATRIOT Life Cycle Environmental Assessment*, Redstone Arsenal, Alabama, U.S. Army Missile Command, 27 December.

U.S. Army Corps of Engineers, Mobile District, 1992. *Environmental Assessment for Static Firing of the Lance Missile Propulsion System at Test Area 5, Redstone Arsenal, Alabama*, 30 January.

U.S. Army Space and Strategic Defense Command, 1991. *Extended Range Interceptor Technology Environmental Assessment*, September.

U.S. Army Space and Strategic Defense Command, 1994. *Theater Missile Defense Hera Target Systems Environmental Assessment*, January.

U.S. Army Space and Strategic Defense Command, 1994. *Theater High Altitude Area Defense (THAAD) Initial Development Program*, March.

U.S. Army Space and Strategic Defense Command, 1995. *Theater Missile Defense Extended Test Range Final Environmental Impact Statement*, January.

U.S. Army Space and Strategic Defense Command, 1995. *Theater Missile Defense (TMD) Flight Test Environmental Assessment*, April.

U.S. Army Space and Strategic Defense Command, 1995. *Theater Missile Defense Flight Test Supplemental Environmental Assessment*, November.



- U.S. Department of the Army, 1988. *Addendum Life Cycle Environmental Assessment, Army Tactical Missile System*, White Sands Missile Range, New Mexico, 15 March.
- U.S. Department of the Army, 1991. *Army Tactical Missile System, Site-Specific Environmental Assessment for White Sands Missile Range, New Mexico*, November.
- U.S. Department of the Army, 1995. *Environmental Assessment for the PATRIOT Missile System, White Sands Missile Range, New Mexico*, June.

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## **2.0 Description of Proposed Action and Alternatives**

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## 2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

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### 2.1 PROPOSED ACTION

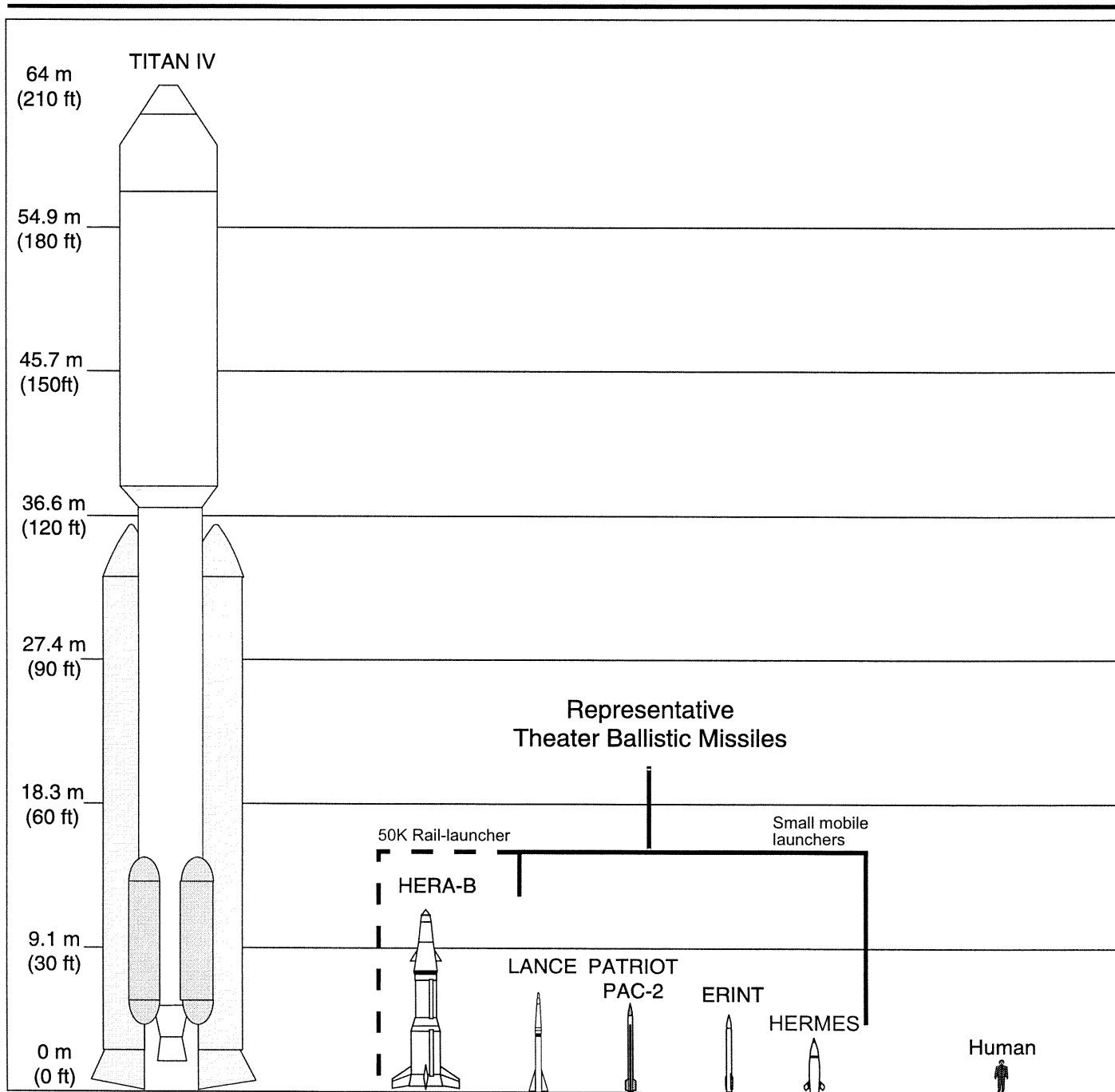
In cooperation with Vandenberg AFB, the U.S. Army Space and Missile Defense Command (USASMDC) proposes to launch small, solid- and liquid-propellant theater ballistic missiles (TBMs) and sounding rockets from mobile launchers on several launch sites on Vandenberg AFB. In addition, it is proposed that larger target missiles, such as the Storm, ARIES, and Hera, be launched from a 50k rail launcher located on Space Launch Complex (SLC)-5. Figure 2-1 compares the relative sizes of missiles currently launched from Vandenberg AFB with the proposed small theater mobile targets. The small mobile launchers could be located on any of the following locations, shown in figures 2-2 and 2-3:

- North Vandenberg
  - Group A: Launch Facility (LF)-06, LF-07, LF-09, LF-25, LF-26
  - Group B: LF-21, LF-22, LF-23, LF-24
  - Group C: Test Pad-01, Rail Garrison Peacekeeper, Advanced Ballistic Re-entry System (ABRES) A sites 1, 2, 3, 576-E
- South Vandenberg
  - Group D: SLC-3W, SLC-5
  - Group E: V-33

The proposed action would expand the target launch capability of Vandenberg AFB to support future Navy, Air Force, and Army operations in the Western Range. These operations could include realistic test situations for intercepts by defensive missile systems. Up to approximately 30 target launches are anticipated per year; an average of five launches could occur every 2 months, with up to five launches occurring in a 3-day period for a particular exercise. Some launches may occur simultaneously. The 50k rail launcher would be installed on an existing concrete pad or within a previously graded or graveled area where a concrete pad could be constructed. Construction of new support facilities would not be required. There would be no overflight of the islands off the coast of California.

#### 2.1.1 MISSILE DESCRIPTION

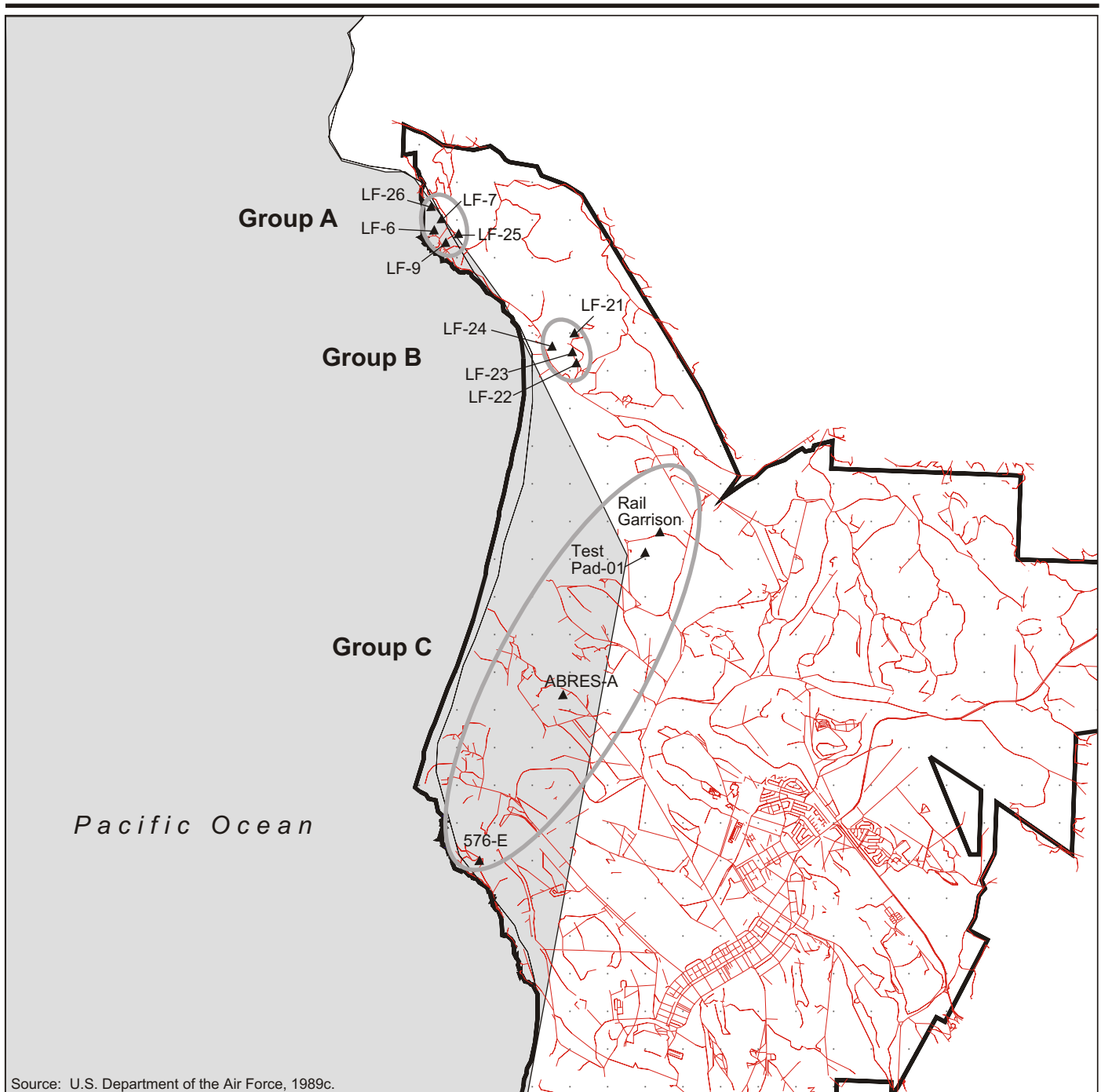
Missiles would include target missiles, consisting of both liquid and solid fuel propulsion systems, and interceptor missiles. The Lance missile has been proposed for use as a target, as well as other liquid propellant missiles with similar characteristics which were



Source: U.S. Army Space and Strategic Defense Command, Test and Evaluation Office, 1995.

## Theater Ballistic Missile Target Vehicle Comparison

Figure 2-1



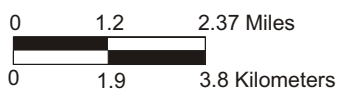
## EXPLANATION

▲ Candidate Launch Site

## Target Launch Site Groups



Scale



Northern Vandenberg AFB

**Figure 2-2**

cdr/078blance

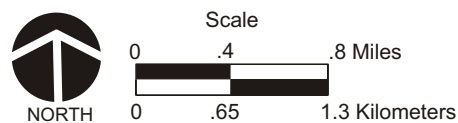
TBM Targets EA



## EXPLANATION

- ▲ Candidate Launch Site
- ⚓ Off-shore Oil Rig Platform

## Target Launch Site Groups



Lance 026-A

TBM Targets EA

Southern Vandenberg AFB

**Figure 2-3**

described and analyzed in the U.S. Army Kwajalein Atoll Temporary Extended Test Range EA. Results of that EA will be summarized and included where applicable.

Proposed small, solid propellant target missiles would include the HERMES Target System and PATRIOT as a Target (PAAT) and sounding rockets such as the Black Brant IX, Two-stage Terrier, Terrier/Orion, Castor I, and STRYPI II. Larger target missiles such as Hera, Storm, and ARIES would be launched from the 50k rail launcher.

#### **2.1.1.1 Target Missiles**

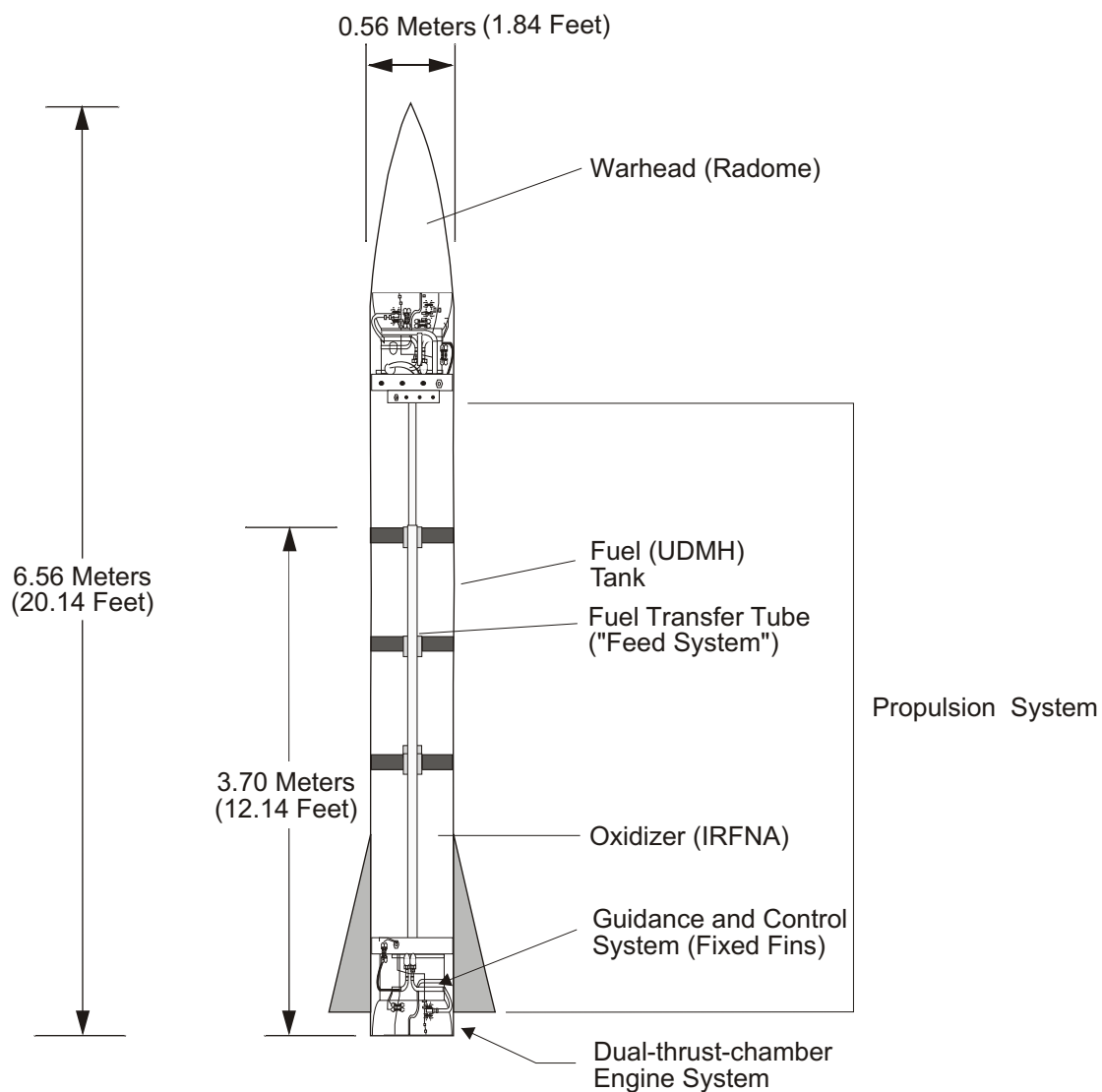
Existing electrical power will be utilized for target missile launches where available; should the need arise, however, Vandenberg AFB has back-up, permitted power generators that can be employed.

#### **Liquid Fuel Missiles**

**Lance Missile.** Flight testing for the Lance missile began in 1965 at White Sands Missile Range (WSMR), New Mexico, and by the 1970s it was fielded for use by the United States and other North Atlantic Treaty Organization (NATO) countries. The Lance missile system has since been replaced by the Army Tactical Missile System (ATACMS), which has incorporated the latest technology. As a result, it has been proposed that Lance missiles be utilized as targets for other air defense systems. (White Sands Missile Range, 1996)

The Lance guided missile (see figure 2-4) is a storable, rocket engine powered vehicle that uses liquid hypergolic propellants consisting of inhibited red fuming nitric acid (IRFNA) as an oxidizer and unsymmetrical dimethyl hydrazine (UDMH) as a fuel. Hypergolic propellants contain various combinations of chemicals that will self-ignite upon contact with each other without a spark or other external initiation. The major sections of the missile are the warhead, the guidance and control system, and the propulsion system consisting of a feed system and rocket engine. The propulsion system is shipped and stored in a container separate from the warhead. Lance will not carry explosive warheads when being used as a target. (U.S. Army Corps of Engineers, Mobile District, 1992)

The Lance propulsion system consists of the guidance and control compartment, the feed system, and the rocket engine with "boattail" cover. When fully loaded, Lance's propulsion system contains approximately 499 kilograms (1,100 pounds) of IRFNA and some 170 kilograms (375 pounds) of UDMH per missile. A reddish-brown acid, IRFNA is a highly corrosive oxidizing agent that spontaneously reacts with UDMH and certain other organic substances; its highly toxic vapors have a characteristic pungent odor, and will irritate skin and eyes. IRFNA dissolves in water, and care must be taken because of its induced boiling effects. (U.S. Army Corps of Engineers, Mobile District, 1992) UDMH, a clear, colorless liquid with a sharp ammonia-like or fishy odor, is toxic when inhaled, absorbed through the skin, or taken internally. Dissolvable in water, UDMH is not sensitive to shock or friction. However, when UDMH comes in contact with IRFNA, or any other oxidizing material, spontaneous ignition occurs. In addition, UDMH vapors greater than 2 percent in air can be detonated by an electric spark or open flame. (U.S. Army Corps of Engineers, Mobile District, 1992)



Source: Systems Applications Management Office, 1995.

## Lance Target (Liquid Fuel) System

Mobile Launches

**Figure 2-4**



The Lance missile is a fixed-fin system. Currently, it does not utilize a flight termination system (FTS); however, its performance will be evaluated by Vandenberg's 30<sup>th</sup> Space Wing Flight Safety Office (30 SW/SE) personnel prior to launching to determine if an FTS is warranted. If so, the FTS will need to fully comply with requirements in Eastern and Western Range regulation (EWR) 127-1, *Range Safety Requirements*, dated 31 March 1995. In order to protect support personnel and the general public from unnecessary risk, 30 SW/SE will also develop "safe areas" along approved trajectories.

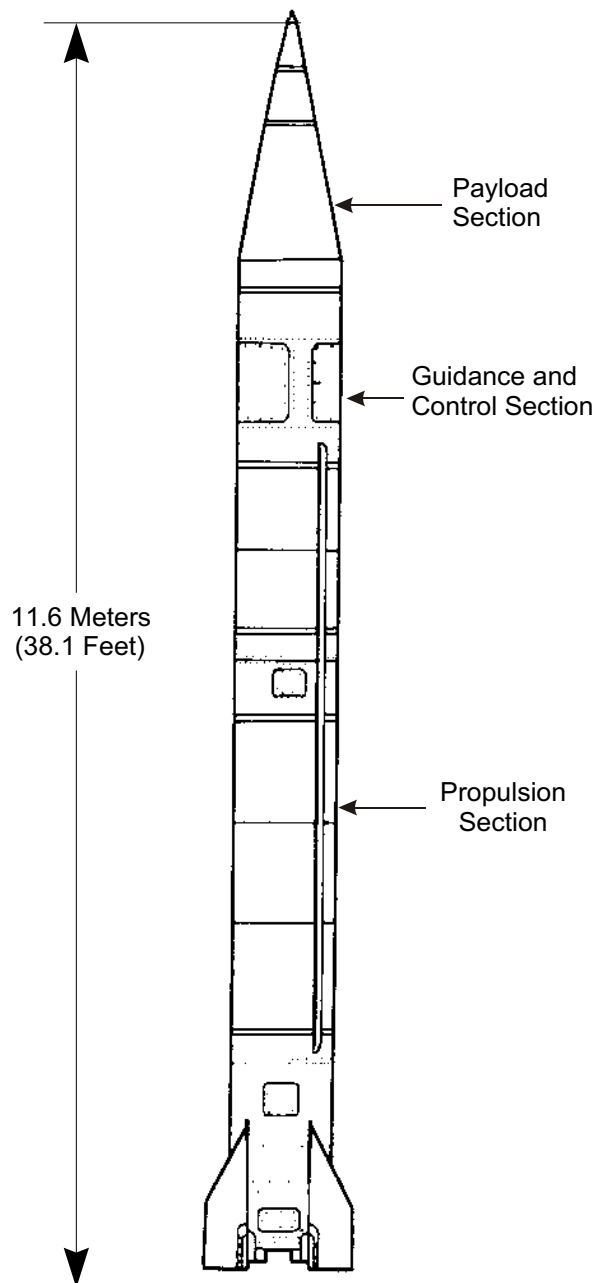
**Additional Liquid Fuel Missiles.** The additional proposed liquid propellant target missiles (figure 2-5) would be single-stage ballistic missiles with an inertial guidance system and a non-separating payload that have been successfully flight tested without incident at U.S. Kwajalein Missile Range in first quarter 1997.

The missiles are composed of a payload section, guidance and control section, and propulsion section. The propulsion section consists of the propellant tanks (fuel and oxidizer), rocket engine, and associated valves, plumbing, and interface structure. This target would not carry a live warhead; the payload section will house telemetry and flight termination instrumentation. The overall length of the target missiles would be approximately 11.6 meters (38 feet). When fully fueled, a missile contains approximately 825 kilograms (1,815 pounds) of kerosene fuel (with coal tar distillates), 30 kilograms (66 pounds) of initiator fuel, and 2,920 kilograms (6,425 pounds) of IRFNA oxidizer. The main fuel is composed of approximately 60 percent coal tar distillate (aromatic components) consisting of benzene, toluene, mixed xylenes, and cymene (methyl isopropyl benzene), with the balance being kerosene. The initiator is a 50/50 mixture of triethylamine/dimethylanilines. The oxidizer is hypergolic with the initiator fuel, and exothermically reacts with the kerosene-based fuel requiring a shock to combust. (Sikes, 1997)

The missiles are stored unfueled, and are fueled just prior to launch. The targets would be transported and launched from their own mobile launcher at several Vandenberg sites. Several propellant transfer systems (both pressure and pump transfer systems) have been developed and used for previous missile fueling operations. Total oxidizer and fuel vapor emissions can vary, depending on the propellant transfer equipment used and how it is assembled. Army and Vandenberg AFB vapor emissions requirements shall be followed for fueling operations. Fuel fill schematics are provided in appendix E.

Preparation of the liquid propellant missile for launch could involve the use of ethyl alcohol, a common fuel-cleaning solvent. Only water is used to rinse oxidizer equipment. No other volatile organic compounds (VOCs) will be used in this stage of operations, nor will modifications to existing facilities, unusual utility requirements, or additional personnel be required.

The targets also possess an FTS. This FTS provides Range Safety personnel with the capability to terminate thrust during the powered flight by initiating the propellant shut-off system of the missile. A flight termination command could be issued by the Range Safety Officer under certain conditions, such as violation of established range safety boundaries, loss of real-time missile position data from on-board navigation units, or unstable or erratic flight. The estimated time between receipt of this command and thrust termination is 400 milliseconds.



Source: VISTA, 1997

## Additional Liquid Fuel Missile

Mobile Launches

**Figure 2-5**

## Solid Fuel Target Vehicles

The proposed solid fuel target system launch vehicles under consideration may contain an FTS. Its purpose is to safely terminate the flight of the launch vehicle in the event of an unsafe condition developing during flight, such as traveling off-course. As with the Lance, target missile performance will be evaluated by 30 SW/SE personnel prior to launching to determine if an FTS is warranted (Garcia, 1997). If an FTS is mandated, it will be in accordance with EWR 127-1. The FTS would be activated by range safety personnel. The FTS technique is to detonate an explosive charge that ruptures the solid rocket motor casing, resulting in loss of pressure and termination of thrust. (U.S. Army Space and Strategic Defense Command, 1994b)

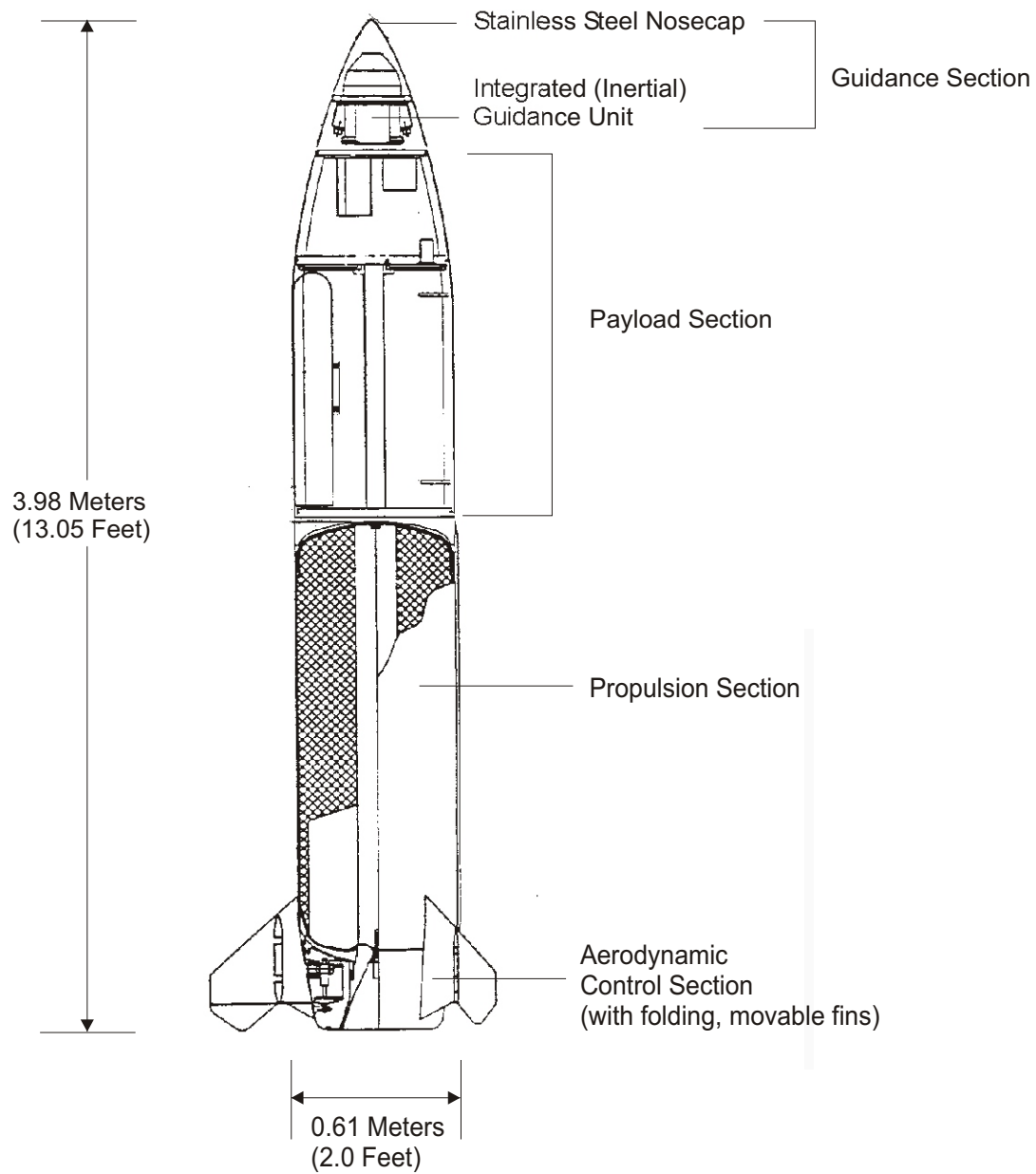
Solid propellants are composed of three basic components: a fuel element, an oxidizer element, and a binder holding the fuel and oxidizer together in solid form (U.S. Army Space and Strategic Defense Command, 1994b). Typical solid fuel launch vehicles are described below.

**HERMES.** The HERMES Target System is a variant of the ATACMS and is currently in the development stage. Development of the ATACMS and flight testing at WSMR began around 1985; it effectively entered service early in 1991 for use in the Gulf War (JANE's Strategic Weapons Systems, 1995). ATACMS was developed as a ground-launched missile system capable of destroying selected high-value targets while remaining outside the area of target threat. The HERMES has been proposed as an economically viable alternative for use as target missiles. (White Sands Missile Range, 1988)

The HERMES is a short-range, solid-propellant, inertially guided missile (see figure 2-6) consisting of guidance, payload, propulsion, and aerodynamic control sections (comprising four folding, swept, rectangular, clipped fins) that form the airframe of the missile. It utilizes a rocket launcher mounted on top of a tracked vehicle. (White Sands Missile Range, 1988; JANE's Strategic Weapons Systems, 1995) Somewhat similar in design to, but shorter than, the Lance, HERMES is 3.98 meters (13.05 feet) in length, with a body diameter of 0.61 meters (2 feet) and a launch weight of 1,670 kilograms (3,681.7 pounds) (JANE's Strategic Weapons Systems, 1995). With a payload of 450 kilograms (992.5 pounds), its solid propellant motor allows a range of up to 135 kilometers (83.9 miles).

**PATRIOT As A Target.** The PATRIOT missile system has been operational since 1966. The PAAT is a fully operational PATRIOT Advanced Capability (PAC)-2 missile that was originally designed to provide the PATRIOT system with the capability to defend itself and critical assets against TBM threats while providing protection from aircraft and cruise missiles. PAC-2 missiles have been suggested for use as economical target missiles in addition to their use as interceptor missiles.

The PAAT is a solid-propellant, surface-to-air guided missile (figure 2-7) installed in a tactical canister. It is equipped with four clipped-delta movable control surfaces (fins) mounted on the tail. The major components of the PAAT include the radome, terminal guidance section, warhead section, propulsion section, and control section. The propulsion system is 5.3 meters (17.4 feet) in length.

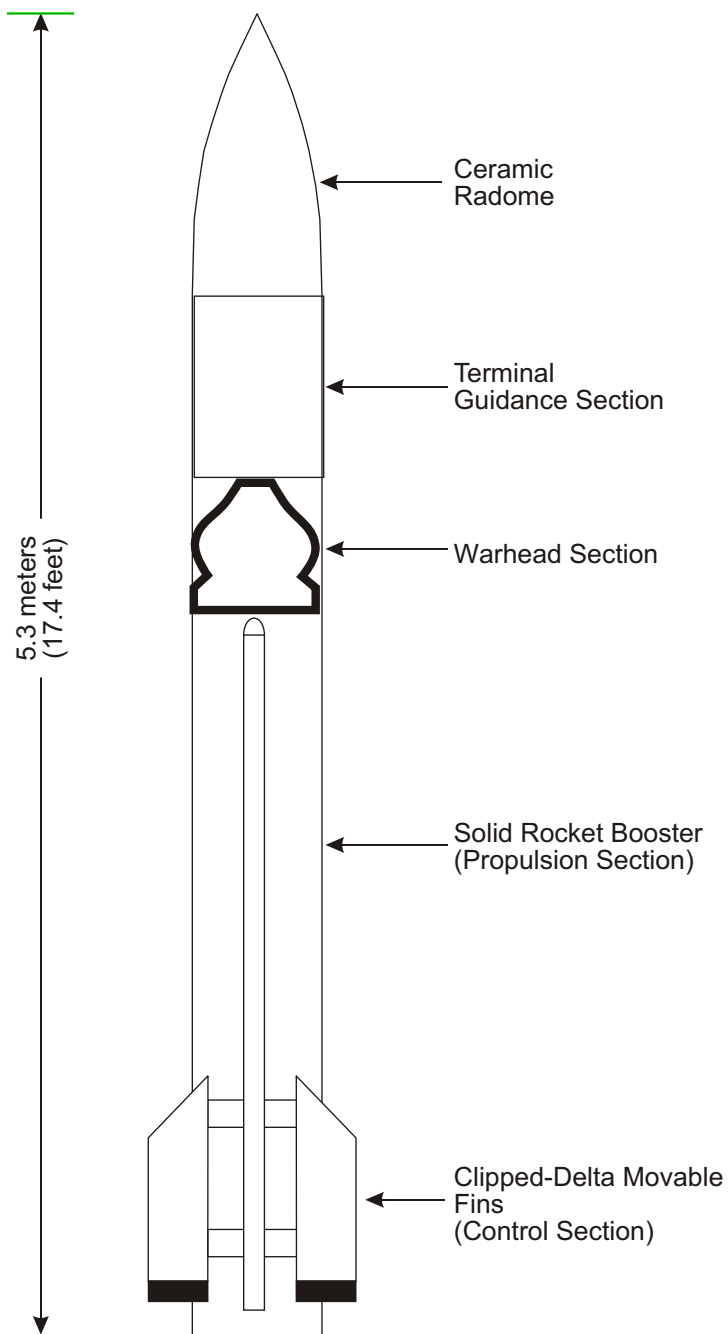


Source: U.S. Department of the Army, 1991.

## HERMES Target (Solid Fuel) System

Mobile Launches

**Figure 2-6**



Source: U.S. Army Space and Strategic Defense Command, 1996a.

## PAAT Target (Solid Fuel) System

Mobile Launches

**Figure 2-7**

**Hera.** The Hera target was designed in 1994 to provide realistic targets for TMD interceptors. Hera targets would simulate expected threats in order to validate and test the capabilities of the TMD systems. Previous flight testing has been performed at WSMR.

The Hera target is a two-stage, solid propellant rocket (see figure 2-8) consisting of an SR19-AJ-1 first stage, an M57A-1 second stage, and a ballistic or maneuvering reentry vehicle. These motors were originally developed and manufactured for other missile programs. The Hera target is approximately 12 meters (39 feet) long overall with a diameter of 1.32 meters (4.33 feet) and weighs approximately 10,000 kilograms (22,000 pounds). Propellant constituents include ammonium perchlorate, aluminum, polyurethane, polybutadiene, nitroglycerine, nitrocellulose, and cyclotetramethylene-tetranitramine. (U.S. Army Space and Strategic Defense Command, 1994a)

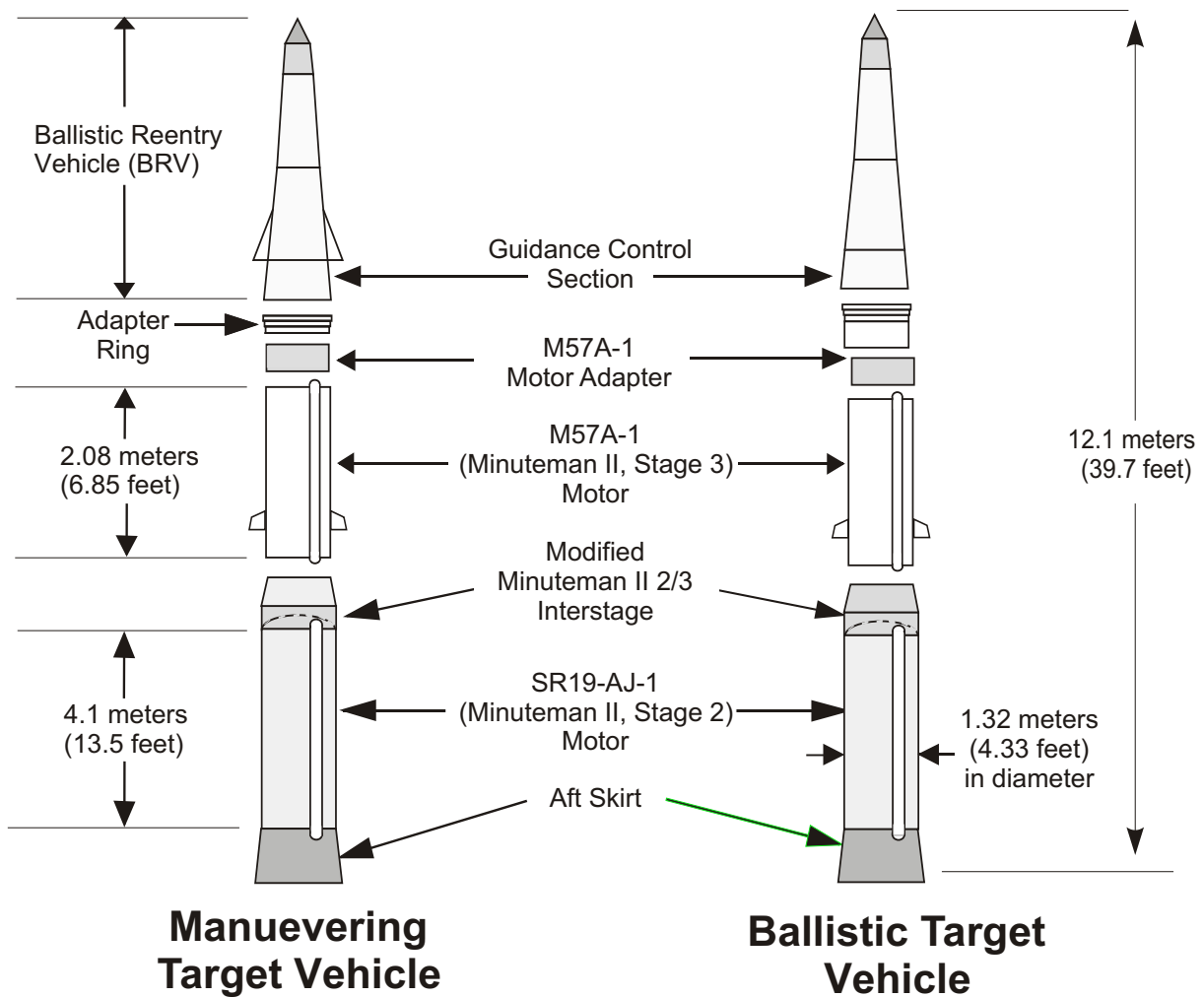
**Black Brant IX.** The Black Brant IX (figure 2-9), also known as the Terrier-Black Brant, is a two-stage, unguided solid propellant missile that was first launched in March 1982. The Black Brant IX combines the Black Brant V with either a Terrier MK 12 Mod 1 or Terrier MK 70 first stage booster. This booster has four 2,193.5-square centimeter (340-square inch) fin panels arranged in a cruciform configuration. Its launch weight is 2,141 kilograms (4,721 pounds). Diameters for the missile are 0.46 meters (1.5 feet) for the Terrier booster and 0.44 meters (1.4 feet) for the Black Brant V (with standard payload configuration). The vehicle length is 9.56 meters (31.4 feet), to which a payload length of typically 3.96 meters (13 feet) is added (U.S. Department of the Air Force, 1996).

The propellant for the Black Brant IX weighs 997 kilograms (2,198 pounds) and is of the ammonium/perchlorate/aluminum/lactic binder type with small amounts of carbon black, iron, and sulfur. Its exhaust emissions are mainly aluminum oxide ( $\text{Al}_2\text{O}_3$ ), carbon monoxide (CO), hydrogen chloride (HCl), water, and nitrogen. (U.S. Department of the Air Force, 1996)

Black Brants are prone to fly into the wind or “weathervane” unless controlled; therefore, when flown as the upper stage of a Black Brant IX, the Black Brant V can be equipped with a Saab Space S-19 booster Guidance System (comprising four gyro-controlled canards) to reduce vehicle and wind related dispersion. The second stage Black Brant V igniter housing contains an ignition delay timer mechanism, a two-weight yo-yo de-spin system, and a spring-type separation system. (U.S. Army Space and Strategic Defense Command Test and Evaluation Office, 1995)

**Two-Stage Terrier.** The two-stage Terrier (figure 2-10) (also known as the DR-2 or Terrier-Terrier) comprises two Terrier MK 70 Mod 1 (TX-664) motors; it is configured as a target vehicle, but is not limited to that application. The motor is an upgrade of the Terrier MK 12, with a higher solids load (that is, a new, improved propellant configuration) (Krause, 1997). It has been previously tested at the Wallops Island Flight Test Facility (WIFTF), Point Mugu Naval Air Warfare Center, and WSMR.

The diameter of the Terrier missile is 0.46 meters (1.51 feet); its length is 4.27 meters (14 feet). The two-stage Terrier’s total length is 9.92 meters (32.54 feet). The Terrier’s propellant weighs 535 kilograms (1,129 pounds) and is of the nitrocellulose/nitroglycerin family with added lead compounds and aluminum. Primary exhaust emissions are CO, carbon dioxide ( $\text{CO}_2$ ), nitrogen, water, and  $\text{Al}_2\text{O}_3$ . (U.S. Department of the Air Force, 1996).

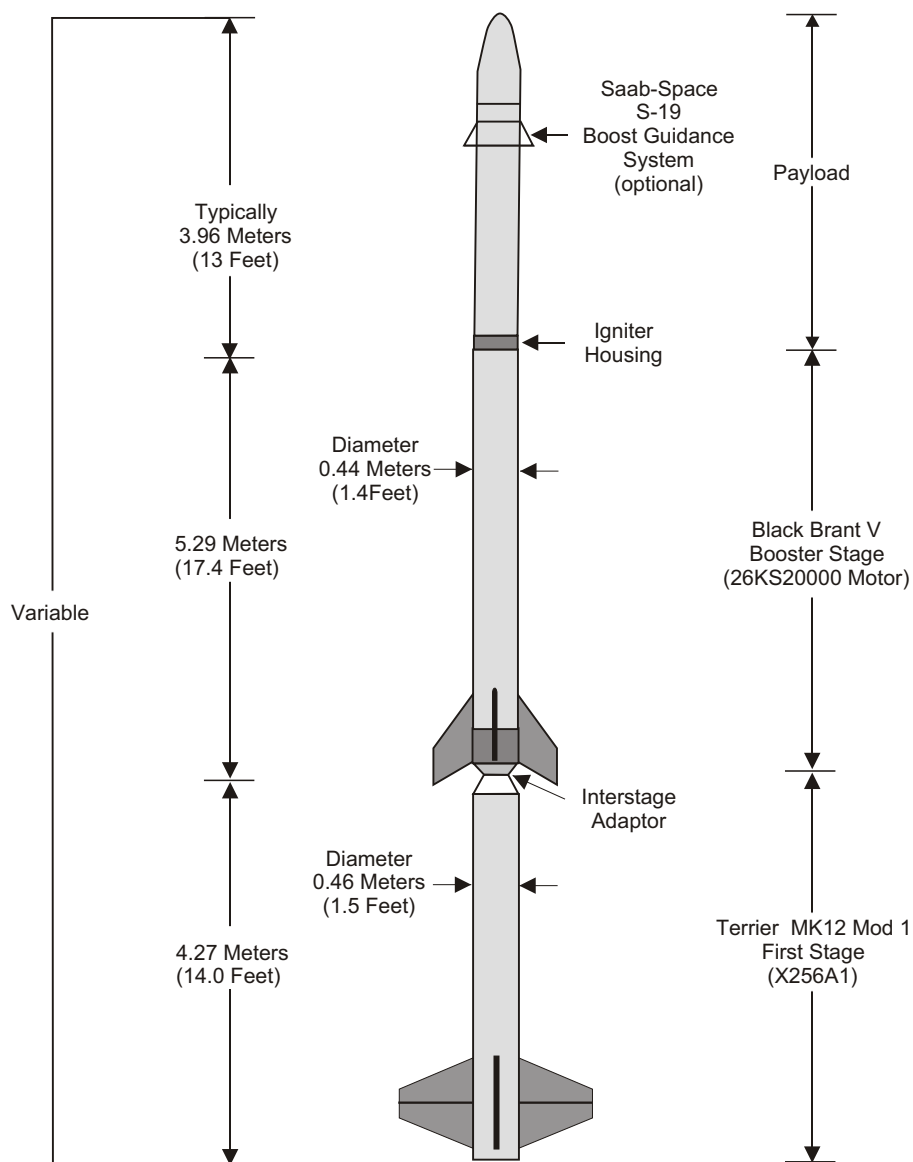


Source: U.S. Army Space and Strategic Defense Command, 1995.

## Hera Target (Solid Fuel) System Configuration Options

Rail Launches

**Figure 2-8**



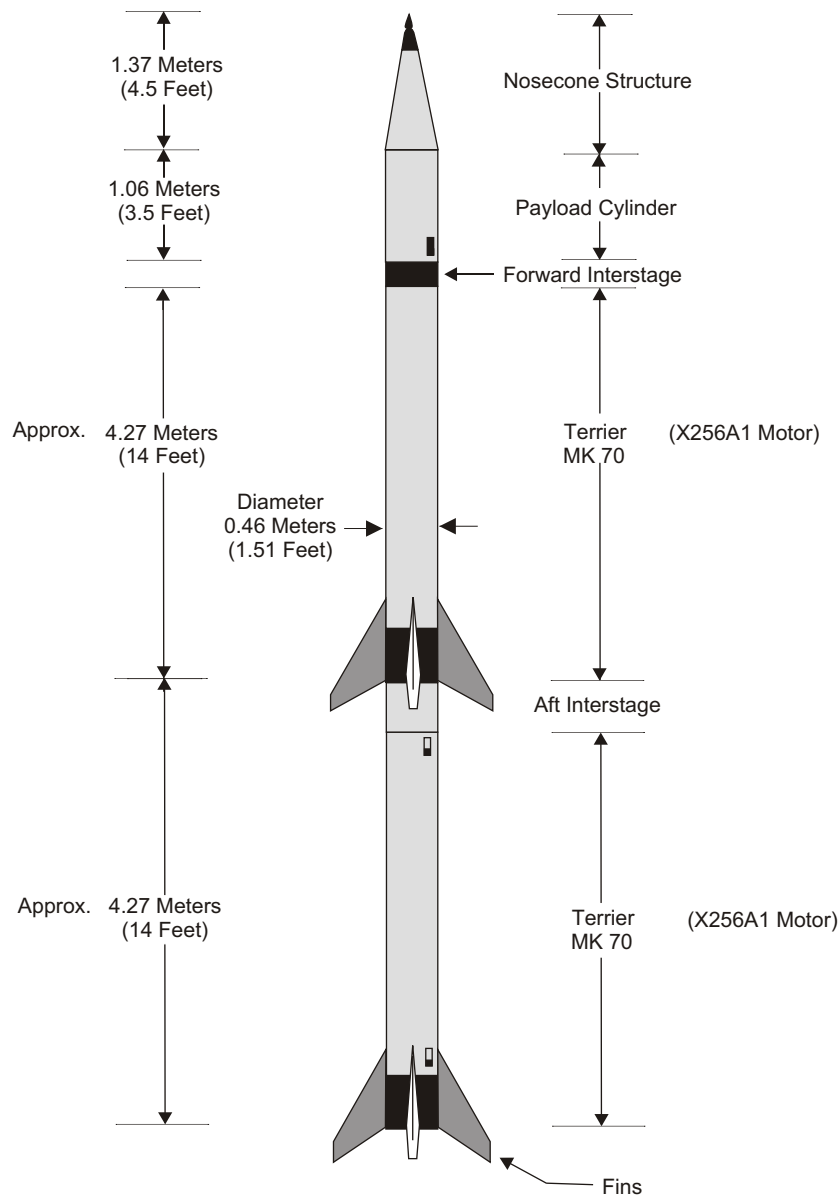
Source: Bristol Space, 1997.

## Black Brant IX Vehicle Configuration

Mobile Launches

**Figure 2-9**





Source: Orbital Sciences Corporation, 1997.

## Two-Stage Terrier Target (Solid Fuel) System

Mobile Launches

**Figure 2-10**

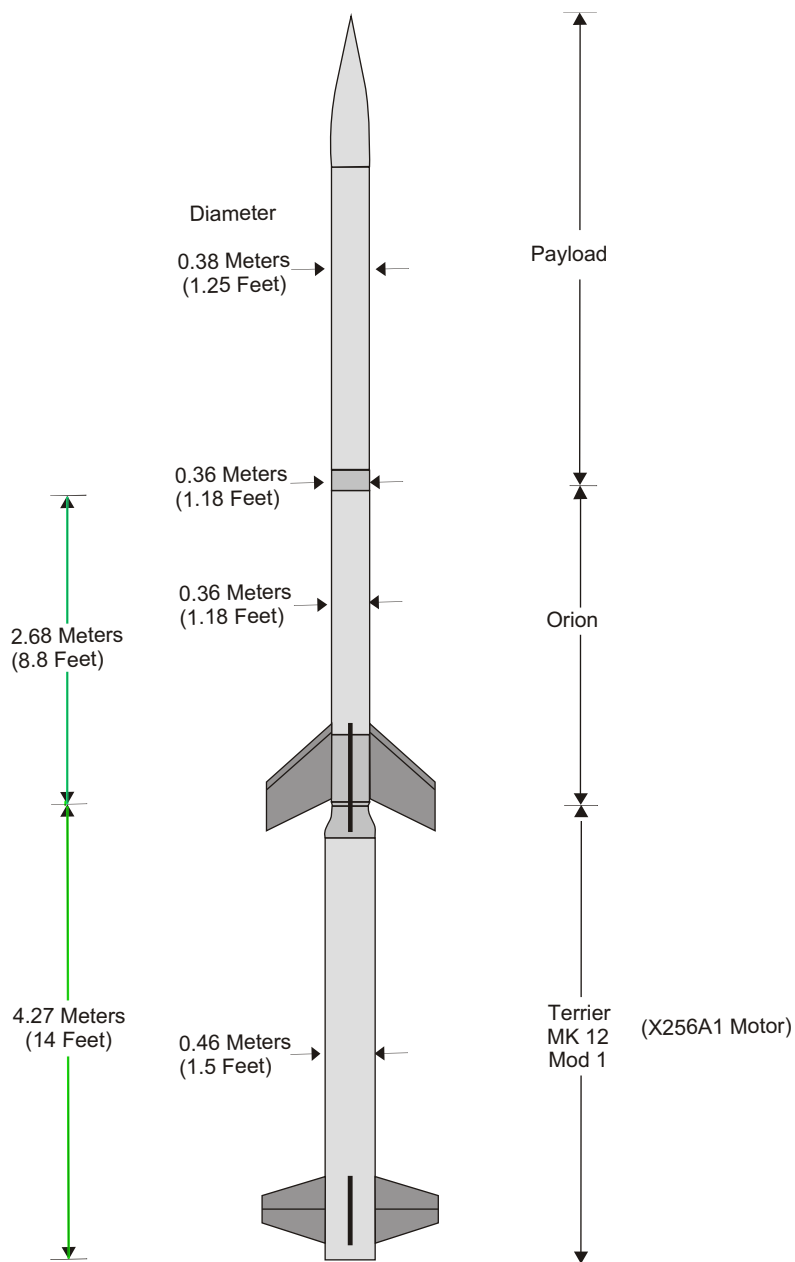
**Terrier-Orion.** The Terrier-Orion (figure 2-11) employs a Terrier MK 12 Mod 1 (X256A1) motor as a booster and an improved standard Homing All-the-Way Killer (HAWK) missile (designated Orion by NASA). The standard configuration Orion has been flown at WSMR, WIFTF, and Andoya Rocket Range, Norway, as a sounding rocket vehicle. The diameter of the Orion is 0.36 meters (1.18 feet); its length is 2.68 meters (8.8 feet). The Orion propellant weighs 278 kilograms (614 pounds) and is a mix of ammonium perchlorate, polyurethane, and nitroguanadine with an aluminum additive. Its exhaust emissions are mainly HCl, water, CO, Al<sub>2</sub>O<sub>3</sub>, and CO<sub>2</sub>.

**Castor I.** The Castor I (figure 2-12) (TX—33-39) rocket motor was developed in 1959 for the Littlejoe and Scout (second stage) programs. Its steel case is a longer version of the Sergeant case design. Castor Is have been successfully flown in hundreds of missions (and in many configurations), generally as a first or second stage booster with such rockets as Athena, Talos, and STRYPI. (U.S. Army Space and Strategic Defense Command Test and Evaluation Office, 1995) The Castor I's length is 8.81 meters (28.9 feet). It has previously been tested at WIFTF, WSMR, Poker Flat Research Range, Fairbanks, Alaska, and Barking Sands, Kauai, Hawaii. Its principal exhaust components are CO, Al<sub>2</sub>O<sub>3</sub>, and HCl.

**STRYPI II.** The STRYPI II is a single-stage sounding rocket utilizing three solid-propellant motors: a Castor I and two strap-on XM-19 Recruit boosters (figure 2-13). Though attaining lower velocities than the three-stage STRYPI VII R and STRYPI XI, it is also used to support reentry target missions. (U.S. Army Space and Strategic Defense Command Test and Evaluation Office, 1995) With the igniter, the Castor I contains 3,339 kilograms (7,361 pounds) of TP-H-8038 solid propellant, and each Recruit contains 118.8 kilograms (262 pounds) of IP-E8035-AM solid propellant. Predominate exhaust products include Al<sub>2</sub>O<sub>3</sub>, CO, water, HCl, and CO<sub>2</sub>.

**Storm.** The Storm target missile (figure 2-14) uses an SR-19-AJ-1 solid propellant motor with modified RVC; it has been flight tested at WSMR as well. The Storm measures 9.9 meters (32.5 feet) and consists of a radar section, payload section, guidance and control section, and an interstage between the former and the SR-19. The SR-19 utilizes ANB-3066 propellant and has a 7,042-kilogram (15,485-pound) launch weight (U.S. Army Space and Strategic Defense Command, 1994a). The primary combustion products for the SR-19 are Al<sub>2</sub>O<sub>3</sub>, CO, HCl, and water; the total weight for all combustion products is 6,296 kilograms (13,581 pounds).

**ARIES.** The ARIES target missile (figure 2-15), a single-stage vehicle using an M56A1 solid propellant motor, has also been flight tested at WSMR. The M56A1 contains approximately 1,658 kilograms (3,655 pounds) of Explosive Class 1.3 solid propellant providing 7,757 kilograms (17,100 pounds) of thrust. The motor burn time is approximately 65 seconds. Aerofins and an interstage (which houses the guidance package) are added to the motor for stability, control, and payload integration; the stage mass below includes the aerofins. (U.S. Army Space and Strategic Defense Command Test and Evaluation Office, 1995)

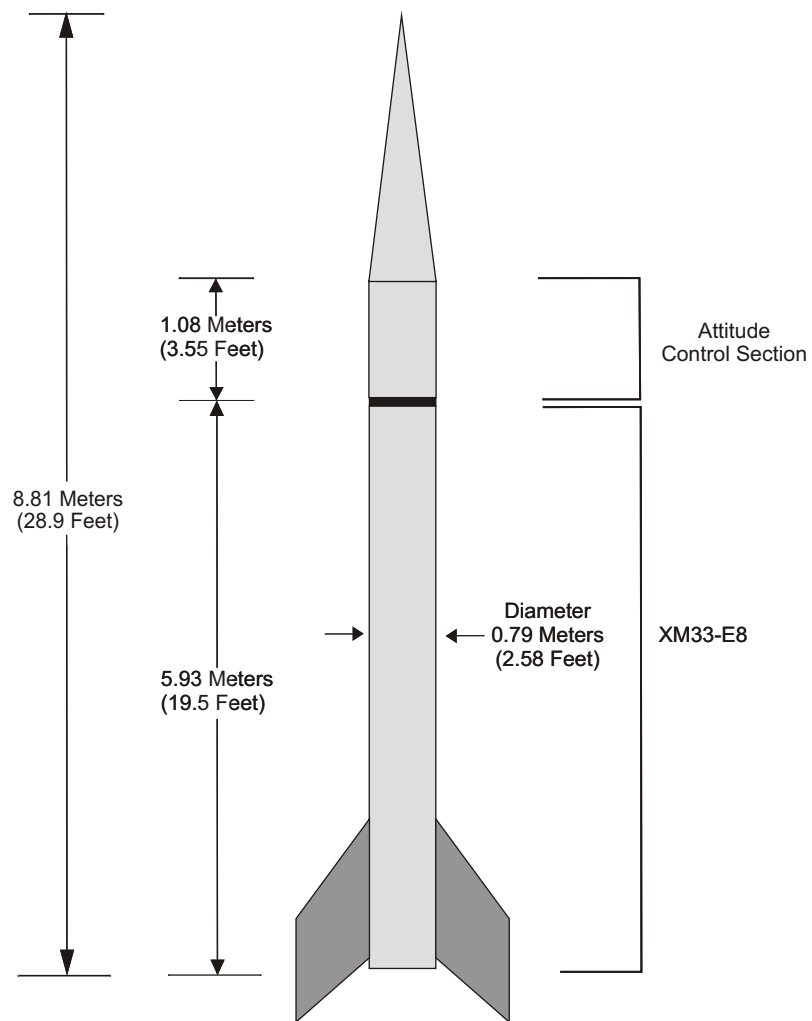


Source: U.S. Navy, Program Executive Office for Theater Air Defense, 1995.

## Terrier/Orion Target (Solid Fuel) System

Mobile Launches

**Figure 2-11**

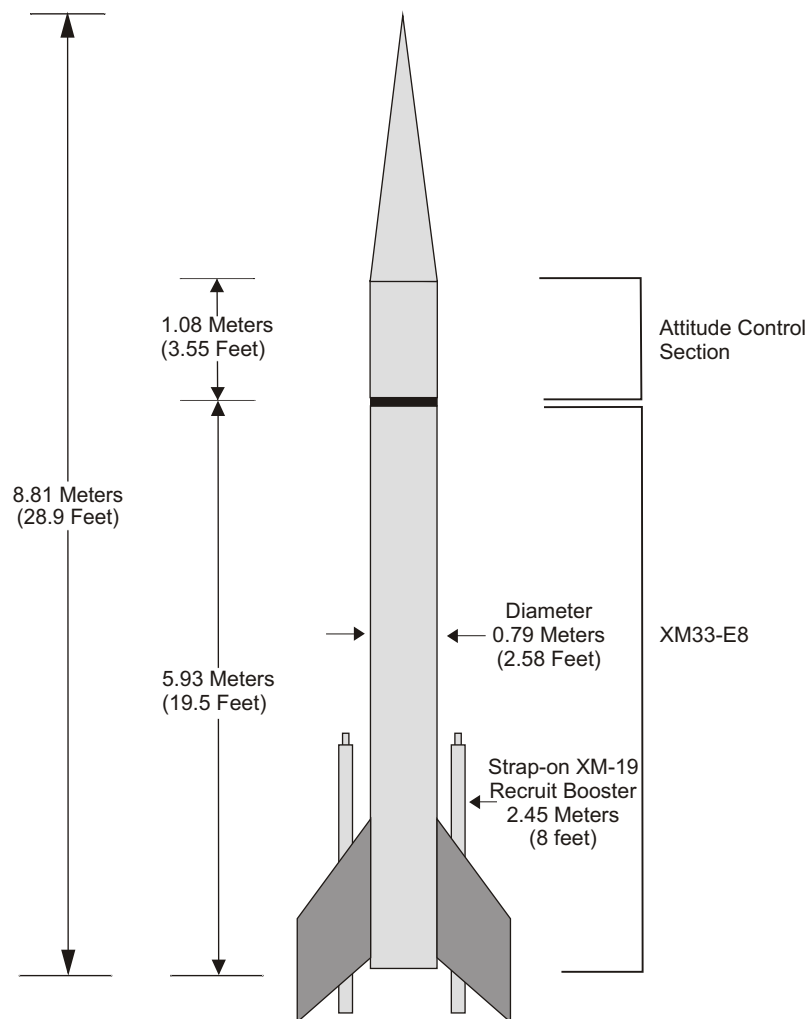


Source: U.S. Navy, Program Executive Office for Theater Air Defense, 1995.

## Castor I Target (Solid Fuel) System

Mobile Launches

**Figure 2-12**

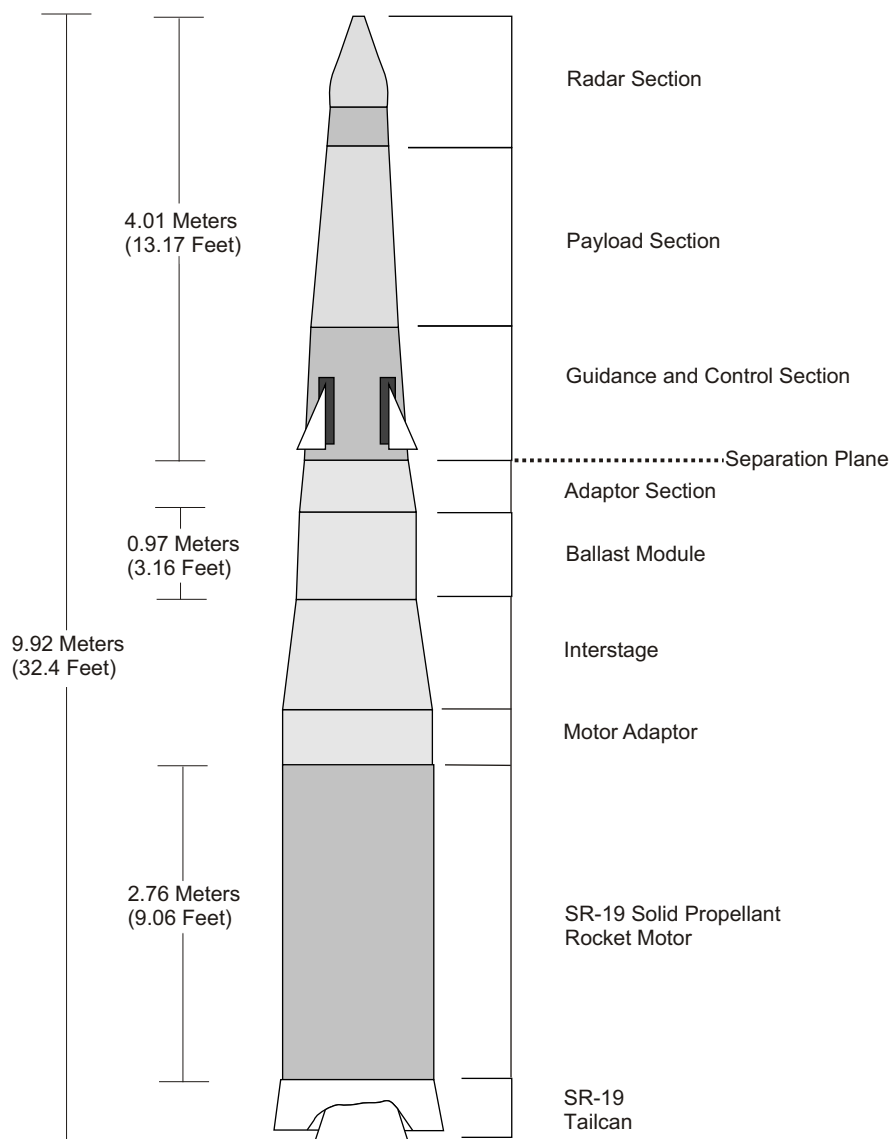


Source: U.S. Navy, Program Executive Office for Theater Air Defense, 1995.

## STRYPI-II Target (Solid Fuel) System

Mobile Launches

**Figure 2-13**

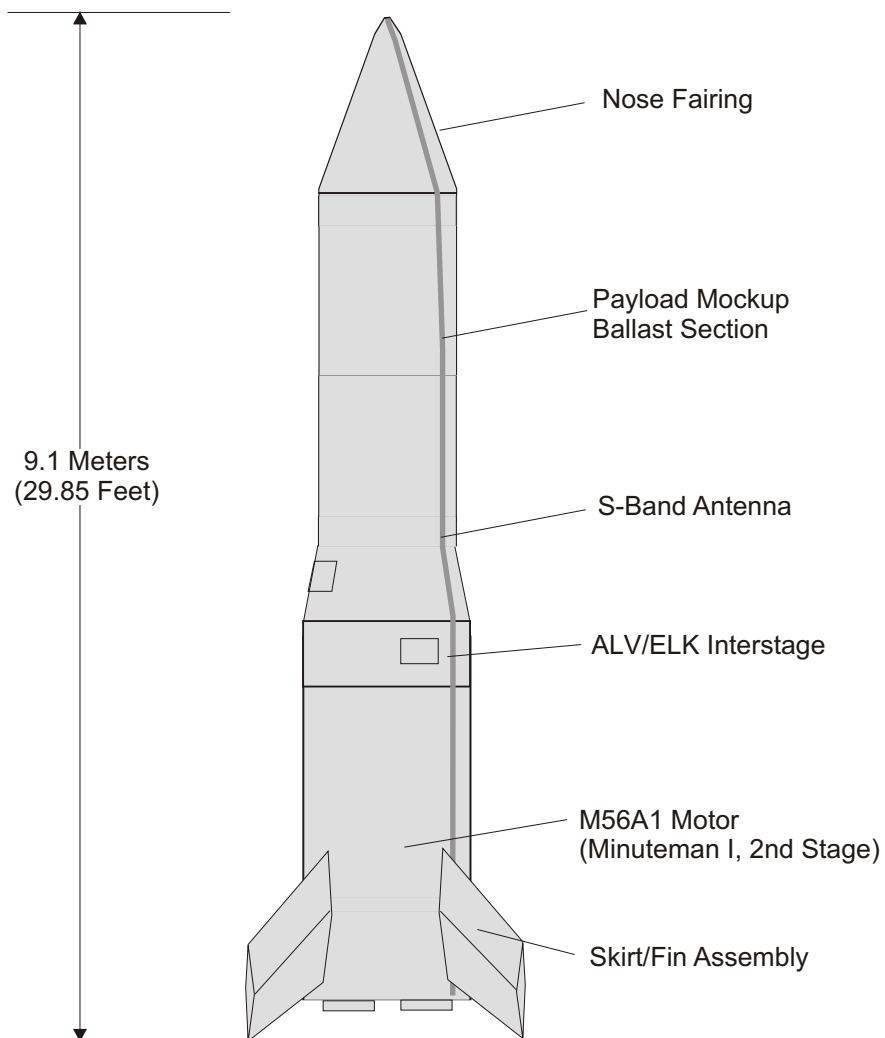


Source: Orbital Sciences Corporation, 1996.

## Storm Target (Solid Fuel) System

Rail Launches

**Figure 2-14**



Source: U.S. Army Space and Strategic Defense Command, 1996b.

## ARIES Target (Solid Fuel) System

Rail Launches

**Figure 2-15**

### **2.1.1.2 Defensive Missile Systems**

Defensive missiles typically would be surface-to-air missiles (interceptors). Interceptor missiles destroy threat missiles or re-entry vehicles in flight. Typical interceptor missiles that could be considered include, but are not limited to, the Army Theater High Altitude Area Defense (THAAD), the PAC-2 and PAC-3, Corps Surface-to-Air Missile (SAM), the Navy Standard Missile (SM)-2, Block III or IV-A, and the Air Force theater ballistic missile currently under development. Defensive missiles could be launched from ground sites, ships, or aircraft. Defensive missiles could be single- and multi-stage solid propellant boosters. Solid propellants are composed of three basic components: a fuel element, an oxidizer element, and a binder holding the fuel and oxidizer together in solid form (U.S. Army Space and Strategic Defense Command, 1994b). This EA evaluates typical intercepts by systems previously evaluated in the TMD Extended Test Range EIS and other environmental documents listed in section 1.4.

Most defensive missiles would be flown on trajectories designed to intercept target missiles. Flight test profiles would vary greatly in trajectory and range. Defensive missiles may also contain an FTS; again, this allows termination of vehicle thrust in the event of unsafe flight conditions. The FTS would either be activated by range safety personnel, or would consist of a ground-based or on-board automatic destruct system, or both. Once thrust is terminated, the flight vehicle would fall into the Pacific Ocean. (U.S. Army Space and Strategic Defense Command, 1994b)

### **2.1.2 PREFLIGHT TEST ACTIVITIES**

The target missiles and support equipment would be transported to Vandenberg AFB by aircraft, rail, or over-the-road common carrier truck from U.S. Government storage depots or contractor facilities in accordance with applicable Department of Transportation (DOT) regulations. At Vandenberg AFB, the missiles would be placed in secure storage until assembly and launch preparation. Applicable safety regulations would be followed in the transport and handling of hazardous materials. An appropriate explosive safety quantity distance (ESQD) would be established and maintained around facilities where missiles or other ordnance is stored or handled in accordance with all applicable Federal, state, local, and installation regulations. A metal plate, utilized to deflect hot exhaust from the Lance booster and protect the immediate area from scorching, would be placed at the launch site. (U.S. Army Space and Strategic Defense Command, 1994b)

Upon arrival at Vandenberg AFB, the liquid propellant missile components and support equipment would undergo final preflight assembly and integration and necessary preflight tests. A transfer and fueling trailer would be used to support transport, assembly, disassembly (if required), fueling, and detanking operations. An environmental shelter mounted on a standard pickup truck would house the launch control system equipment required near the launch pad. A launch control van, connected by fiber optics, would house launch control and monitoring, communications, and range safety equipment. All electrical equipment is rated for use in hazardous environments. An accident response team and ordnance personnel would control propellants and ordnance. Specific, standardized procedures would be followed for fuel/oxidizer transfer in accordance with Army and Vandenberg AFB requirements for handling of liquid rocket propellants (Chemical



Propulsion Information Agency, 1973). These procedures incorporate measures to minimize both the amount of waste propellants generated during transfer operations and the potential for accidental spills.

The missile oxidizer would be stored in an existing fueling area. The missile fuels would be stored in the existing fuel storage buildings. All personnel involved in propellant transfer operations (from storage vessels to the missile) would wear protective clothing and receive specialized training in liquid propellant safety and handling and spill containment and cleanup.

Since the Lance missile is shipped pre-fueled, no fueling operations will be required prior to its use. A closed-system propellant transfer stand (figure 2-16) designed by Lockheed-Martin will be used for proposed liquid propellant missiles other than the Lance. This fueling system has been successfully utilized for two previous load-outs and successful fuelings. Both kerosene-based and initiator fuels are liquid at normal handling temperatures and pressures, and do not readily vaporize into the air; thus, very little fuel vapor would be released into the atmosphere during fueling operations. Similarly, UDMH does not readily vaporize into the air; very little, if any, would be released into the atmosphere during fueling operations.

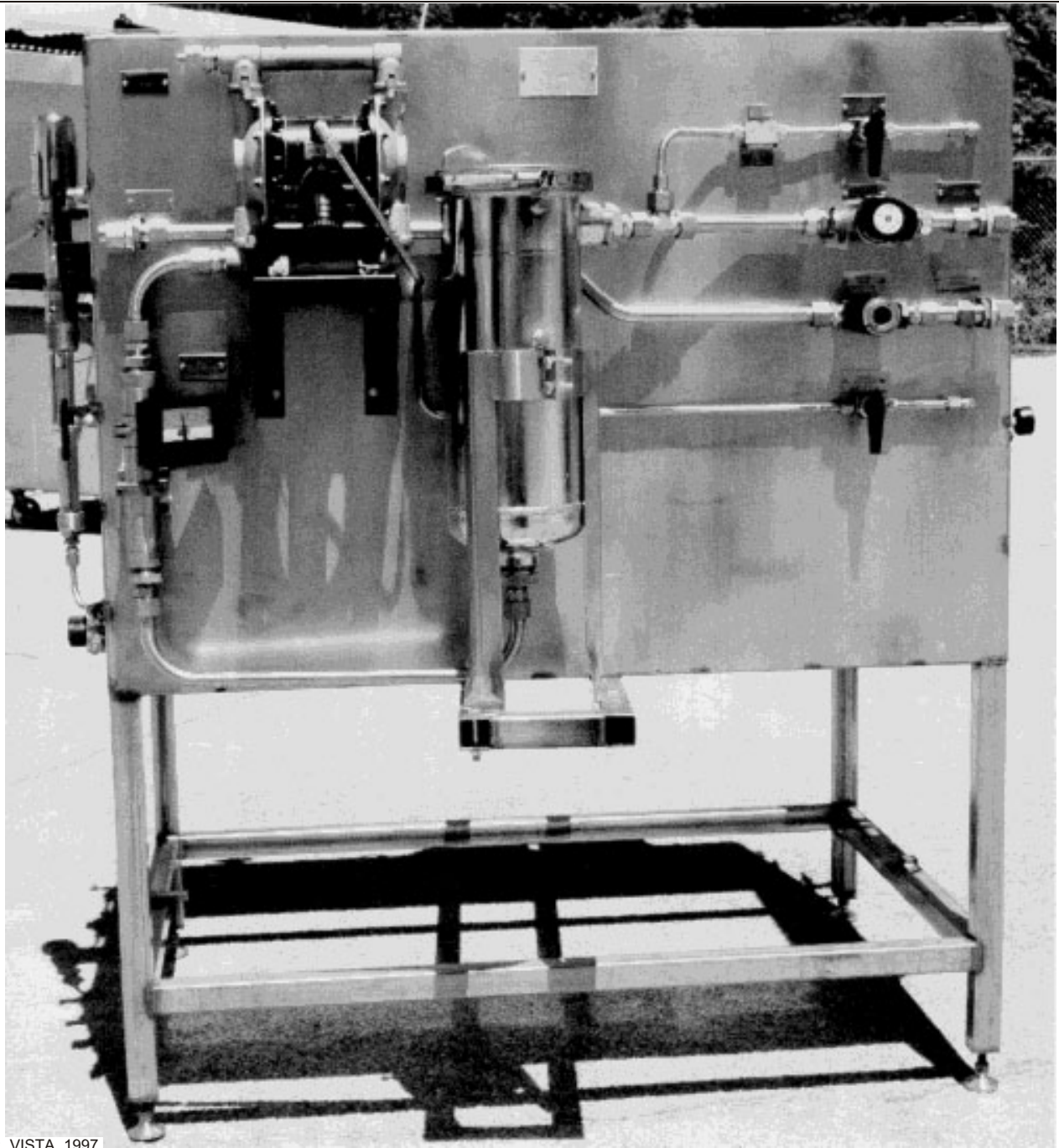
Information obtained from these two previous operations and from the environmental assessment of U.S. Army Kwajalein Atoll Temporary Extended Test Range indicates that approximately 10 grams (0.4 ounce) of oxidizer could be released during fueling operations. Release of fuel emissions is dependent upon the type of propellant transfer system used. The use of vapor capture filters could reduce emissions.

After completion of the transfer operations, the oxidizer transfer system would be flushed with water. The fuel transfer system would be flushed with an equal amount of ethanol. This operation is expected to result in approximately 5 grams (0.2 ounce) of nitric oxide gas released to the atmosphere and 624.6 liters (165 gallons) each of a mild nitric acid solution (less than 0.05 percent) and ethyl alcohol (waste alcohol with approximately 40 grams [1.4 ounces] of fuel in solution) that would be collected and disposed of per applicable regulations. The fully assembled and fueled missile would then be moved to the launch site.

The fueling procedures described above are part of a written procedure that has been previously reviewed and approved by U.S. Army Kwajalein Atoll Range Safety and will be reviewed and approved by appropriate range authorities at Vandenberg AFB prior to any fueling operations (Tevebaugh, 1997).

Spill response supplies, equipment, and trained personnel would be available. A Liquid Propellant Accident Response Plan is currently in use that minimizes impacts in the event of a spill. Empty bulk liquid propellant containers would be available for use in the event that de-tanking of the missile became necessary.

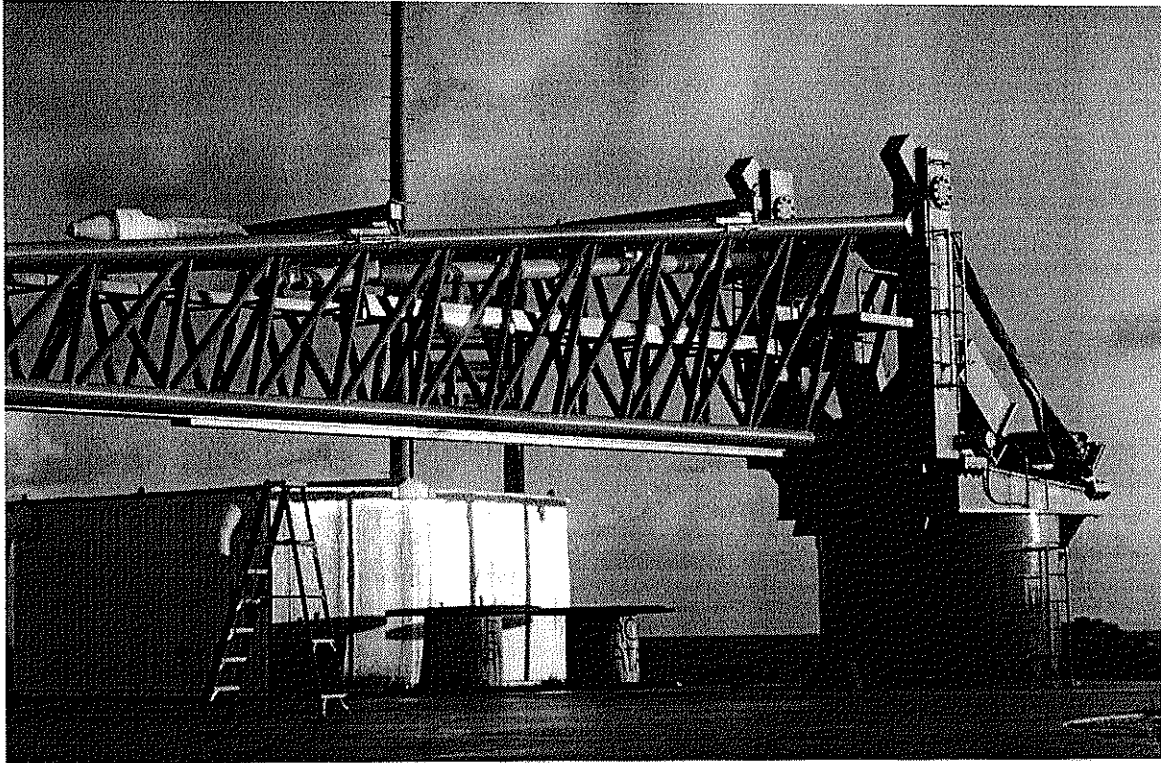
A 50k rail launcher would be installed at SLC-5 (figure 2-17). This location has existing concrete or paved surfaces upon which a rail launcher could be installed. Several types of target missiles, including the Hera missile, could be launched by a rail launcher.



Source: VISTA, 1997.

**Propellant Transfer  
Stand**

**Figure 2-16**



Source: EDAW, Inc., 1997.

## 50K Rail Launcher

Figure 2-17

A mobile rail launcher would be used for launching the sounding rockets selected as targets (see figures 2-18 and 2-19). The launcher location would require a level, graveled area or concrete pad.

### 2.1.3 FLIGHT TEST ACTIVITIES

#### 2.1.3.1 Launch

The target systems would be launched from mobile or fixed launchers at several Vandenberg sites, of which the following were analyzed previously in the TMD Extended Test Range Final EIS: SLC-5; the Rail Garrison Peacekeeper site; Test Pad-01; ABRES-A; 576-E; and the deactivated LF-7, -21, -23, and -24 sites. Additional sites in groups A, B, D, and E were selected for potential use by Vandenberg AFB (see section 2.1). An ESOD of 381 meters (1,250 feet) would be established and maintained around each site up to actual launch time, at which point, designated areas would be evacuated of personnel.

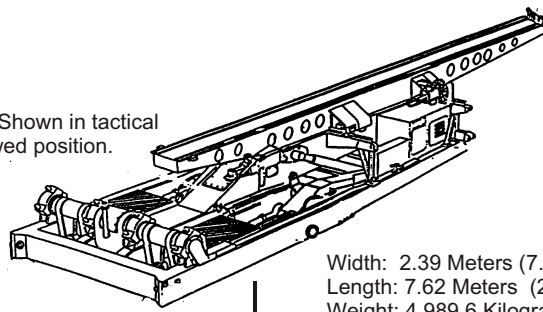
The areas that will be protected for TMD-type missions will include:

- the impact limit line, a boundary demarcating the protection line for all non-mission-essential personnel
- the Launch Caution Corridor, an area limited to essential personnel
- the launch hazard area (LHA), an area about the launch point limited to essential personnel in hardened facilities
- the Stage Impact Area, an area for any stages of either the target or intercept missile
- the Debris Area, which results from a successful intercept
- the Impact Locations, for both target and intercept vehicles in the event of a miss

Each launch site has its own limiting azimuthal boundaries, as shown in appendix A. These azimuths are limited to ensure that potential missile failure would not result in debris outside the azimuthal boundaries. Figure 2-20 portrays the possible launch azimuths for various coastal launch points. Final launch azimuth ranges will be established for each target vehicle after the final launch site is selected, all vehicle performance data and areas of endangerment are reviewed, and FTS requirements have been established. (U.S. Army Space and Strategic Defense Command, 1994b)

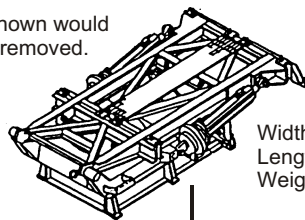
Defensive missile systems would be launched from aboard ships, aircraft, or ground sites; their profiles would vary greatly in trajectory and range. Inasmuch as flight testing requires collection and analysis of flight data, defensive missile flights would be supported by optical sensors, telemetry receivers, and radar. Most of these data-collection systems are existing or mobile and would not require construction to support theater ballistic missile interceptor testing at Vandenberg AFB. Ground-based optical sensors, radar, and

Launcher Portion - Shown in tactical configuration. Stowed position.



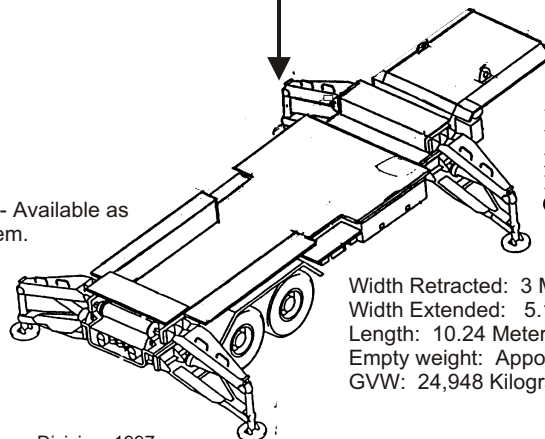
Width: 2.39 Meters (7.83 Feet)  
Length: 7.62 Meters (25 Feet)  
Weight: 4,989.6 Kilograms (11,000 Pounds)  
Capacity: 5,400-6,800 Kilograms (12,000-15,000 Pounds)

Azimuth Turntable - Unit shown would have the elevation portion removed.



Width: 2.44 Meters (8 Feet)  
Length: 4.27 Meters (14 Feet)  
Weight: 3,175 Kilograms (7,000 Pounds)

All terrain carrier - Available as standard stock item.

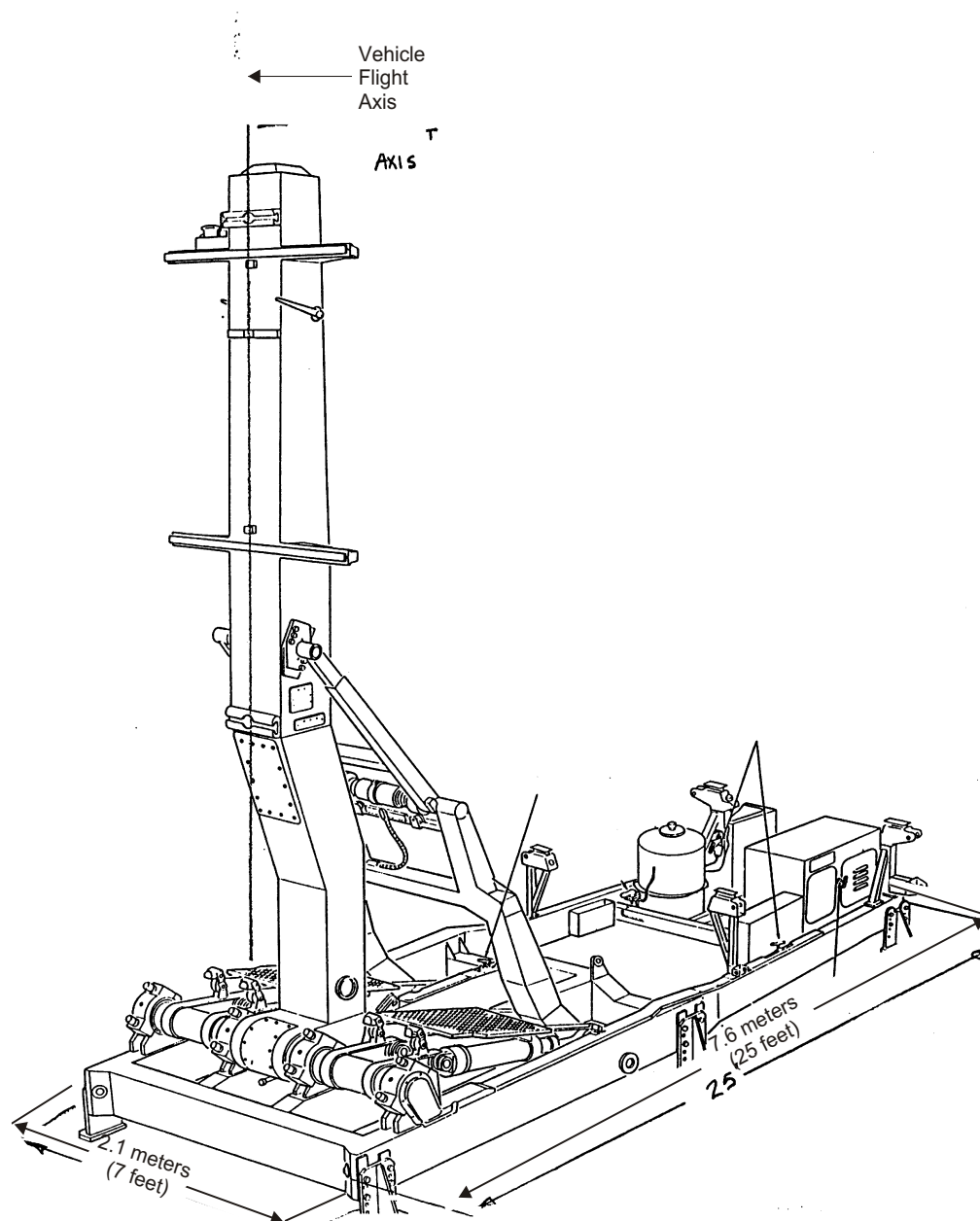


Width Retracted: 3 Meters (9.83 Feet)  
Width Extended: 5.16 Meters (16.92 Feet)  
Length: 10.24 Meters (33.6 Feet)  
Empty weight: Appox. 10,886 Kilograms (24,000 Pounds)  
GVW: 24,948 Kilograms (55,000 Pounds)

Source: Naval Air Warfare Center - Weapons Division, 1997.

## Typical Mobile Launcher Components

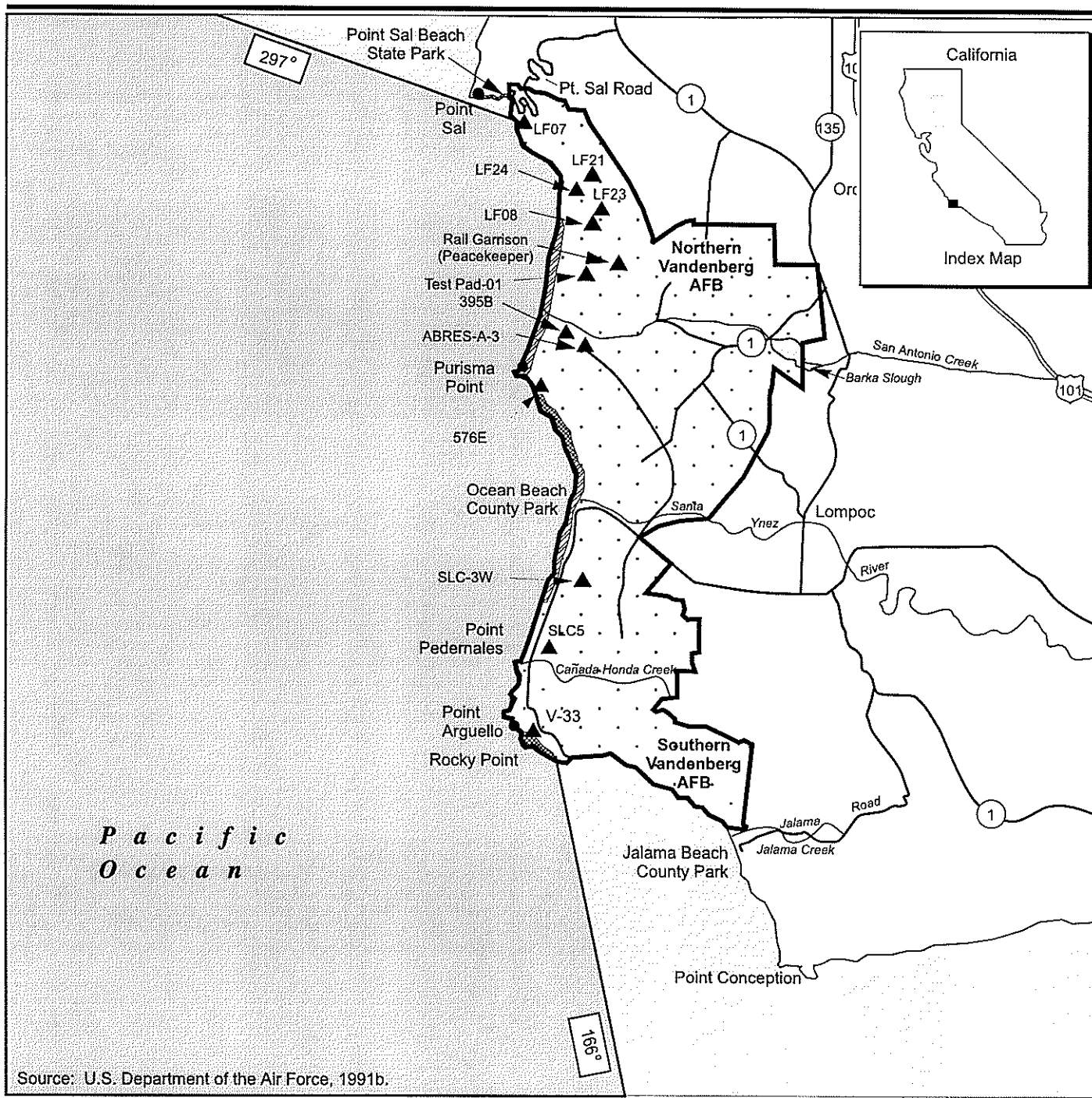
Figure 2-18








Source: Naval Air Warfare Center - Weapons Division, 1997.

**Representative Mobile  
Launcher without  
Flatbed Trailer**

**Figure 2-19**



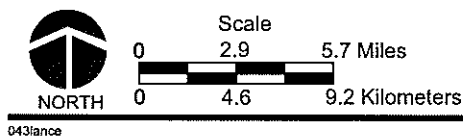
# EXPLANATION

- |   |  |   |                           |
|---|--|---|---------------------------|
|  | Nesting Location of California Least Tern/ Western Snowy Plover                  |  | Launch Trajectory Azimuth |
|  | Haulout Location of California Sea Lion, Northern Elephant Seal, and Harbor Seal |  | Angle of Azimuth          |
|   |  |  | Candidate Launch Site     |

## Combined Target Launch Azimuths, Vandenberg, AFB

Western Range Area

Figure 2-20



telemetry stations may be supplemented by ship-based or airborne sensors. (U.S. Army Space and Strategic Defense Command, 1994b)

Launch sites would be selected to minimize potential impacts during pinniped pupping and breeding periods. Personnel would be instructed to avoid avian nesting and roosting areas and marine mammal haulout areas. At the request of the National Marine Fisheries Service (NMFS), the first shot of each target missile type would be monitored for potential impacts from noise; the results will determine if further monitoring of launches will be necessary. Personnel would be briefed on the definition of cultural resources and their protective Federal regulations. Onsite monitoring will be conducted for specific areas of concern as determined by Vandenberg AFB, the U.S. Fish and Wildlife Service (USFWS), and the NMFS, and in accordance with the mitigation and monitoring set forth in the Programmatic Marine Mammal Take Authorization submitted by Vandenberg AFB. Launches from site 576-E will be restricted to the period from 1 October to 31 December to avoid breeding seasons for listed species. Night launches will be avoided where possible; however, some missions may require night or predawn launches in order to accomplish specific program objectives. Launches from Groups D and E will avoid overflights of Points Arguello and Pedernales if possible, specifically during nesting seasons. Jalama Beach will not need to be closed for any of the proposed launches.

#### **2.1.3.2 Debris**

Launch scenarios will be planned to ensure that any debris from an intercept or mishap will fall within the Western Range and the open ocean area off Vandenberg AFB.

Four oil platforms (Irene, Hidalgo, Harvest, and Hermosa) are located along the coast near the Group E candidate launch sites (figure 2-3); planned debris dispersion will not encompass any of these oil rigs. In addition, if target missiles are not equipped with an FTS and the flight path is not approved, a mission impact statement will be required and overflight of oil platforms will be limited so that no more than two platforms per operation are within the safety corridors. After the appropriate risk analysis has been performed, only those oil platforms that are exposed to unacceptable levels of risk will be evacuated.

Test mishaps for target missiles are defined in terms of three scenarios: missile failure on the launch pad, termination of a flight shortly after liftoff, and termination of a flight after the missile has exited the vicinity of the launch pad.

Termination of a flight on the launch pad would be characterized by either a detonation of the booster or a conflagration in which the propellant burns but does not explode. An ESQD surrounding the launch pad would be calculated based on the equivalent explosive force of all propellant and pyrotechnic materials contained in the flight vehicle. For the current target systems, the ESQD is 381 meters (1,250 feet), a radius which would contain all hazardous debris resulting from a missile failure on the pad. During all launch activities, provisions will be made in accordance with EWR 127-1, *Range Safety Requirements*, dated 31 March 1995, to maintain a stand-by emergency response team (consisting of fire fighting, safety, medical, and bioenvironmental engineering personnel) near the launch site to ensure immediate response and rapid control in the event of an accident.



Termination of a flight shortly after liftoff would result in all hazardous debris being contained within the LHA. Non-essential mission personnel are excluded from this area during launch operations; personnel required to work within the LHA boundaries are normally protected in bunkers or behind berms.

30 SW/SE personnel will ensure that the debris from the termination of a flight will fall into areas cleared prior to the launch. Areas such as oil rigs and shipping lanes will be verified clear in accordance with existing Vandenberg AFB Standard Operating Procedures (SOPs). (U.S. Army Space and Strategic Defense Command, 1994b)

If scenarios are developed in which it is predicted that launches from any location would result in booster or intercept debris falling within a 4.83-kilometer (3-mile) distance of the California coast, such launches would not be conducted until consultation with applicable Federal and state regulatory agencies was accomplished. Any debris falling on Vandenberg AFB lands will be handled in accordance with Vandenberg AFB emergency response plans, based upon the 1996 North American Emergency Response Guidebook (Chapman, 1996b).

#### **2.1.4 NO-ACTION ALTERNATIVE**

The no-action alternative is to continue current operations at Vandenberg AFB and the Western Range without adding the capability to launch theater ballistic missile targets and participate in intercept operations.

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## 3.0 Affected Environment

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## 3.0 AFFECTED ENVIRONMENT

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This section describes the environmental components that may be affected by the proposed action, characterized in order to provide a context for understanding and assessing the significance of any potential impacts. Twelve broad environmental components of the affected environment were considered; those of greater concern relevant to the proposed action and its effects are described in greater detail. Thus, the information presented herein is commensurate with their importance, with attention focused on key issues.

Available literature (such as EAs, EISs, and other environmental documentation) was acquired, and questions left unanswered by the data were identified. In an attempt to fill these data gaps and verify and update available information, appropriate installation personnel and Federal, state, and local regulatory agencies were contacted. Cited literature, telephone interviews, and referenced material are presented in section 5.0.

### Environmental Components

Launches of small target missiles from mobile or rail launchers would result in a potential for impacts similar to or less than those discussed in the Extended Test Range EIS (U.S. Army Space and Strategic Defense Command, 1994b) for airspace, geology and soils, infrastructure, socioeconomics, and water resources; those impacts were determined to be insubstantial. The results are summarized in section 4.0.

The following presents a brief description of the methodological approach and the characteristics of the remaining seven environmental components used in the baseline and impact analysis process of this EA.

**Air Quality.** Existing air quality information was reviewed to identify issues, with particular attention paid to background ambient air quality as compared to the primary National Ambient Air Quality Standards (NAAQS). In addition, information was obtained on whether the installation was located in an attainment or nonattainment area. Compliance with air quality permits, indicating that the facility is not in violation of Clean Air Act (CAA) requirements, was ascertained for the proposed action by contacting the appropriate regulatory agencies.

**Biological Resources.** Existing information on plant and animal species and habitat types in the vicinity of the proposed launch sites was reviewed, with particular attention paid to the presence of any protected species, especially Federal or state threatened or endangered species.

**Cultural Resources.** Existing information on cultural resources and the potential for the presence of resources eligible for inclusion in the National Register of Historic Places (National Register) was reviewed.

**Hazardous Materials and Waste.** Existing management practices and records of compliance for hazardous materials and waste were reviewed to determine the installation's capability to handle any additional materials and waste. Records were also

reviewed to determine any potential problems with use, handling, storage, treatment, or disposal that may occur from specific TBM target launch activities.

**Health and Safety.** Existing environmental documents were reviewed. Installation and regulatory agency personnel were contacted, when applicable, to determine if public and occupational health and safety concerns are an issue. Safety regulations were also reviewed with regard to hazardous materials and ordnance storage, handling, and disposal.

**Land Use.** Base master plans, environmental plans, resource management plans, and other existing documents were reviewed to identify any known conflicts between existing and future installation and off-base land uses and the proposed activities.

**Noise.** Existing environmental documentation was reviewed and installation regulatory agency personnel contacted to determine if noise concerns are an issue. Noise modeling was conducted for representative TBM target missiles.

### 3.1 AIR QUALITY

The existing air quality of the affected environment, similar at all launch group locations, is defined by examining air quality monitoring records from stations maintained by the California Air Resources Board (CARB) and the Santa Barbara County Air Pollution Control District (SBCAPCD). In order to characterize the existing air quality background of the area, information on pollutant concentrations measured for short-term (24 hours or less) and long-term (annual) averaging periods is extracted from monitoring station data. Emission inventory information was obtained from the CARB, the SBCAPCD, and Vandenberg AFB. Vandenberg AFB prepares and maintains a complete inventory through its *Air Emissions Comprehensive Inventory Plan, Vandenberg Air Force Base*, (U.S. Department of the Air Force, 1996). Inventory data are separated by pollutant and reported in tons per day to describe the baseline conditions of area pollutant emissions.

#### Region of Influence

The region of influence (ROI) for air quality analysis depends on the specific pollutant of concern. Pollutants other than ozone and its precursors, nitrogen dioxide (NO<sub>2</sub>) and VOCs, are considered to be inert pollutants. That is, they do not react with the surrounding atmosphere to generate additional pollution. Ozone and its precursors are considered to be active pollutants. They have the potential to react with the surrounding environment to generate additional ozone. For this reason, the ROI for active pollutants has a wider range than that of the inert pollutants.

For inert pollutants (those pollutants other than ozone and possible ozone precursors), the ROI is limited to an area within a few miles downwind of the source. Due to the nature of the Proposed Action and its alternatives, this would potentially include the entire County of Santa Barbara.

For active pollutants (ozone and possible ozone precursors), the ROI would be expanded to encompass the entire air basin surrounding Vandenberg AFB, specifically the South Central Coast Air Basin. Therefore, the ROI for ozone, NO<sub>2</sub>, and VOC would include San Luis Obispo, Santa Barbara, and Ventura counties. (U.S. Department of the Air Force, 1995)

Since all project activities would originate in Santa Barbara County, the SBCAPCD would be the regulatory agency for this project. This would be the case even though the active pollutant ROI would encompass two additional counties.

## **Affected Environment**

An air basin is an area of the state, often comprising several counties, that has been designated as such by the CARB based upon similar meteorological and geographic conditions; California consists of 14 air basins. Vandenberg AFB is located in the South Central Coast Air Basin, which consists of San Luis Obispo, Santa Barbara, and Ventura counties (Santa Barbara County Air Pollution Control District, 1994). With respect to air quality, Santa Barbara County is divided into North County and South County. Vandenberg AFB is located within North County; South County includes the region south of the crest of the Santa Ynez Mountains and east of Jalama Beach (U.S. Department of the Air Force, 1995).

### **North Vandenberg Air Force Base**

The State of California has adopted ambient air quality standards that either meet or exceed the NAAQS. The California Ambient Air Quality Standards (CAAQS) are more strict than the NAAQS for ozone, CO, sulfur dioxide (SO<sub>2</sub>), particulate matter less than 10 microns in diameter (PM-10), and lead. In addition to the six criteria pollutants covered by the NAAQS, the CAAQS also contain standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility.

According to Environmental Protection Agency (EPA) guidelines, areas with air quality surpassing NAAQS standards are designated as being in attainment; areas with a lesser air quality are classified as nonattainment areas. A nonattainment designation is given to a region if the primary NAAQS for any criteria pollutant is exceeded at any point in the region for more than 3 days during a 3-year period. Pollutants in an area may be designated as unclassified when there is a lack of data from which the EPA could form a basis for attainment status.

The CARB, like the EPA, designates areas of the state as being either in attainment or nonattainment of the CAAQS. If a CAAQS standard has been exceeded more than once in 3 years, an area is in nonattainment for that pollutant.

Santa Barbara County is currently designated as being in Federal nonattainment for ozone, and in state nonattainment for both ozone and PM-10.

According to the 1994 Clean Air Plan, the most recent finalized air plan for Santa Barbara County, Santa Barbara County is designated as being in moderate nonattainment of the NAAQS. The County has experienced CAAQS exceedances 27-43 days annually from 1986-1993 and NAAQS exceedances up to 9 days annually in the same time frame. It should be noted, however, that during the 1991-1993 period no monitoring station had more than three exceedances of the Federal ozone standard. This means that all the monitoring stations in the county showed "attainment" of the Federal standard. This has led the SBCAPCD to request that the EPA redesignate Santa Barbara County as being in "attainment" for ozone. Additionally, research into transport phenomenon has led to the

generalized conclusion that much of the ozone pollution experienced in Santa Barbara County originates outside the county. (Santa Barbara County Air Pollution Control District, 1994)

Ozone exceedances within Santa Barbara County occur under many meteorological conditions. Thus, no one activity can be targeted to reduce county-wide ozone levels. In addition, precursors from nearby San Luis Obispo and Ventura counties (both in nonattainment for ozone) may contribute to Santa Barbara County's ozone problems. Prior to the enactment of the 1990 Amendments to the CAA, only the South County portion of Santa Barbara County was designated as being in violation of the Federal ozone air quality standard. (Santa Barbara County Air Pollution Control District, 1991a)

The CARB and local air pollution control districts operate more than 200 air monitoring stations in California. Stations located on Vandenberg AFB include two Prevention of Significant Deterioration (PSD) stations, the Vandenberg AFB Space Transport System (near SLC-6) and Vandenberg AFB Point Arguello (U.S. Department of the Air Force, 1995). Stations in the vicinity of Vandenberg AFB include four PSD stations (Casmalia Hills; Lompoc Health, Sanitation and Power; Jalama Beach; and Point Conception) and one state and local air monitoring station site (Lompoc H Street). Each of these stations monitors one or more of the following criteria pollutants: ozone, SO<sub>2</sub>, CO, NO<sub>2</sub>, and PM-10. Both the national and state ozone standards were exceeded at the Vandenberg AFB Space Transport System station, and the state standard was exceeded at all six stations monitoring ozone. The state PM-10 standard was exceeded at the Jalama Beach and Point Conception stations, both of which are south of Vandenberg AFB and in South County. (Santa Barbara Air Pollution Control District, 1991b; California Environmental Protection Agency, 1992)

The 1994 Vandenberg emissions inventory shows that missile launch emissions accounted for 1.99 metric tons (2.2 tons) of PM-10 (less than 1 percent of the total), 46.2 metric tons (50.9 tons) of CO (2.3 percent of the total), and 12.8 metric tons (14.1 tons) of Hazardous Air Pollutants (HAPs).

As stated previously, the pollutants of concern within Santa Barbara County are ozone, NO<sub>2</sub>, VOCs, PM-10, and its possible precursor, SO<sub>2</sub>. Since 1991, all new stationary sources of emissions (and modifications) at Vandenberg AFB have applied best available current technology (BACT) and offset emissions at a 1.2 to 1.0 ratio. Therefore, current emissions at Vandenberg AFB, at least for stationary sources, are likely to be similar to the 1994 emissions inventory.

### **South Vandenberg Air Force Base**

The affected environment for air quality is the same as that discussed regarding North Vandenberg AFB.

### **Determination of Non-Applicability**

The CAA, as amended in 1990, specifies in section 176(a) that no department, agency, or instrumentality of the Federal Government shall engage in, support in any way, or provide financial assistance for, license or permit, or approve, any activity that does not conform to

an implementation plan after it has been approved or promulgated under section 110 of this title. "Conformity" is defined in Section 176(c) of the CAA as conformity to the State Implementation Plan's (SIP) purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards. These activities will not:

- Cause or contribute to any new violation of any standard in any area
- Increase the frequency or severity of any existing violation of any standard in any area
- Delay timely attainment of any standard or any required interim emission reduction or other milestone in any area

Again, Santa Barbara County is classified by the EPA as being in serious non-attainment for Federal ozone requirements, and by the state for non-attainment for PM-10 emissions. The General Conformity Rule of the CAA requires the acting Federal agency to determine whether an action planned in a non-attainment area conforms to the SIP. This determination can take several different forms, of which the one applicable for this action is the Record of Non-applicability (RONA), also called a Determination of Non-applicability (DNA). All reasonably foreseeable criteria emissions and precursors must be calculated. The projected levels of potential emissions must meet two criteria: (a) each emission must be less than the *de minimis* threshold established by the EPA, and (b) the project must not cause significant emission levels of the pollutant(s) for which the area is in non-attainment. Significant emissions are those equal to or greater than 10 percent of the area's budget. The *de minimis* thresholds and SBCAPCD budget levels are shown in table 3-1. The full DNA is included in appendix C.

**Table 3–1. U.S. EPA General Conformity Thresholds and SBCAPCD Daily Emissions Budget**

Criteria Pollutant	Federal Non-Attainment Status	<i>De Minimis</i> Threshold (Tons Per Year)	SBCAPCD Budget (Tons Per Day)
Ozone	Serious	50	n/a <sup>1</sup>
VOC	Ozone Precursor <sup>2</sup>	50	43.87
NO <sub>x</sub>	Ozone Precursor <sup>2</sup>	50	56.05
CO	All <sup>3</sup>	100	n/a <sup>4</sup>
PM-10	Moderate <sup>5</sup>	100	n/a <sup>4</sup>
SO <sub>2</sub>	All <sup>3</sup>	100	n/a <sup>4</sup>
Pb	All <sup>3</sup>	25	n/a <sup>4</sup>

<sup>1</sup>Since TBM Targets will not be emitting ozone, the SBCAPCD budget for ozone is not applicable.

<sup>2</sup>VOC and NO<sub>2</sub> are calculated separately at the same *de minimis* threshold as ozone.

<sup>3</sup>CO, SO<sub>2</sub>, and lead emission estimates are required for all conformity determinations.

<sup>4</sup>Budget levels are only calculated for emissions in Federal nonattainment.

<sup>5</sup>Santa Barbara County is in Federal attainment for PM-10. The moderate nonattainment *de minimis* threshold was used as the lowest listed nonattainment value.

Sources: 40 CFR 93.135(b), 1995; Murphy, 1996

## 3.2 BIOLOGICAL RESOURCES

Existing information on plant and animal species and habitat types in the vicinity of the Vandenberg launch sites was examined, with a particular emphasis on the presence of species listed or proposed by Federal, state, or local agencies as threatened, endangered, or of special concern. Biological studies consisted of literature review, field reconnaissance, and map documentation. A visit to certain sites in both the northern and southern portions of the base was conducted on 8 April 1993 as part of the Extended Test Range EIS process.

### 3.2.1 REGION OF INFLUENCE

The ROI for biological resources would encompass all applicable launch sites, LHAs, and areas within noise contours (see appendix A).

### 3.2.2 AFFECTED ENVIRONMENT

#### Vegetation

Since Vandenberg AFB occupies a transition zone between the semi-desert conditions of southern California and the cool, moist conditions of the north, many plant species and communities reach their northern or southern distributional limits in the area (U.S. Department of the Air Force, 1995). A wide variety of vegetation types is supported on base, including Bishop pine forest, Burton mesa chaparral, coastal dune scrub, sage scrub, and salt marsh, grassland, freshwater marsh, tanbark oak forest, vernal pool, willow riparian, and seasonal wetlands. Approximately 85 percent of Vandenberg AFB vegetation is natural, with the balance either ruderal (invasive vegetation that has replaced natural flora through human disturbance) or developed land (U.S. Department of the Air Force, 1991b). The installation envelops one of the major southern California dune systems, with areas still resembling their original condition, and occupies one of the state's six remaining coastal dune systems. As illustrated by figure 3-1, extensive central foredunes and coastal dune scrub are located on the North Vandenberg coast and south of the Santa Ynez River on South Vandenberg (U.S. Department of the Air Force, 1991a). Some 3,642 hectares (9,000 acres) of dune habitats, together with 267 kilometers (166 miles) of streams and 2,023.5 hectares (5,000 acres) of wetlands, lie within the confines of Vandenberg AFB (U.S. Department of the Air force, 1996).

Four sensitive plant species, the surf thistle (*Cirsium rhotophilum*) and Lompoc yerba santa (*Eriodictyon capitatum*), both Federal Candidate species, and the Federal endangered Gambel's watercress (*Rorippa gambelli*) and Federal and state endangered beach layia (*Layia carnosa*), are present on Vandenberg AFB (U.S. Department of the Air Force, 1988a; 1991a; U.S. Department of the Interior, 1994; Chapman, 1996b). Furthermore, the Vandenberg AFB colonies of surf thistle, also a state-listed threatened species, are the major extant populations (National Aeronautics and Space Administration, 1988). Invasion of alien plants, off-road vehicle traffic, trampling, and the potential, although low, of unrestricted collecting are all likely contributors to these species' decline (California Polytechnic State University, Biological Sciences Department, 1995; Zane Publishing, Inc., 1995). Figure 3-1 indicates the locations of sensitive plant species and habitats.





Thought to no longer occur on base, the nearly-extinct Gambel's watercress was located in August 1996 in a drainage area near the main gate (Vandenberg Air Force Base, 1997). Historic records (circa 1980) indicated the herb to be found in the freshwater marsh of Barka Slough, on the San Antonio Terrace. The plant is known in the state from only one or two remnant occurrences, and this was previously the only known site on Vandenberg AFB or within Santa Barbara County. Possibly suffering from hybridization and the alteration of habitat hydrology by *Eucalyptus*, it is the subject of a current USFWS recovery plan, which may include attempts on Vandenberg AFB. (National Aeronautics and Space Administration, 1988; California Polytechnic State University, Biological Sciences Department, 1995)

## Wildlife

The mosaic of Vandenberg AFB plant communities provides habitat for many resident and migratory animals. Some are specialist species, generally associated with a specific habitat, whereas many are generalists occupying multiple communities; the Western fence lizard (*Sceloporus occidentalis*), garter snake (*Thamnophis spp.*), brush rabbit (*Sylvilagus bachmani*), deer mouse (*Peromyscus maniculatus*), common crow (*Corvus brachyrhynchos*), and mule deer (*Odocoileus hemionus*) are typical examples. Vandenberg's diverse habitats also support a wide variety of listed species, shown in table 3-2. Table 3-3 catalogs sensitive species not regulated by the Endangered Species Act.

Based on the general description of the region, the California tiger salamander (*Ambystoma californiense*), a Federal Candidate species, has been suggested as a likely resident; however, it has not been observed on base despite intensive surveys conducted in 1995 (Vandenberg Air Force Base, 1996a).

Among bird species, the Federal and state endangered Least Bell's vireo (*Vireo bellii pucillus*) and the bald eagle (*Haliaeetus leucocephalus*) occur within the ROI only rarely; western burrowing owls (*Speotyto cunicularia hypugea*) have occasionally been sighted, but only in winter or during migrations (Vandenberg Air Force Base, 1997). Though typically nesting further inland, the Federal threatened (and California endangered) marbled murrelet (*Brachyramphus marmoratus*) is an occasional but rare visitor that fishes in the waters off Vandenberg AFB during summer, fall, and winter (U.S. Department of the Interior, 1994).

Marine mammals that are known or expected to occur in or around the Vandenberg AFB coastline area include 29 cetacean (whale and dolphin) species, 6 pinniped species, and the Southern sea otter (*Enhydra lutris nereis*). Individuals and small groups of gray whales (*Eschrichtius robustus*) are frequently seen inshore during the spring and fall (U.S. Department of the Air Force, 1991b). In addition, harbor porpoises may normally be found within 24 kilometers (15 miles) of the coast, though most other cetaceans remain further offshore and at depths of 182.9 to 1,828.8 meters (600 to 6,000 feet).

Pinnipeds occurring within the ROI include the California sea lion (*Zalophus californianus*), and the Pacific harbor (*Phoca vitulina*), Northern elephant (*Mirounga angustirostris*), and Northern fur (*Callorhinus ursinus*) seals. The remaining two potential inhabitants, the Guadalupe fur seal (*Arctocephalus townsendi*) and Steller sea lion (*Eumetopias jubatus*), are rare visitors at best; the latter has not been observed in the region for nearly a decade.

**Table 3–2: Listed Species Known or Expected to Occur at or in the Vicinity of Vandenberg Air Force Base**

Scientific Name	Common Name	Status		Launch
		State	Federal	Sites
Fish				
<i>Eucyclogobius newberryi</i>	Tidewater goby	E	E	B,C,D
<i>Gasterosteus aculeatus williamsoni</i>	Unarmored threespine stickleback	E	E	C,D
<i>Oncorhynchus mykiss</i>	Steelhead trout	—	PE	near D
Amphibians				
<i>Rana aurora draytoni</i>	California red-legged frog	CSC	PE	A,B,C,D,E
Birds				
<i>Brachyramphus marmoratus</i>	Marbled murrelet	E	T	rare offshore
<i>Charadrius alexandrinus nivosus</i>	Western snowy plover	CSC	T	B,C,D
<i>Charadrius montanas</i>	Mountain plover	CSC	C	C
<i>Empidonax trailii extimus</i>	Southwestern willow flycatcher	E	E	D
<i>Falco peregrinus</i>	American peregrine falcon	E	E	D,E
<i>Haliaeetus leucocephalus</i>	Bald eagle	E	E	near D
<i>Pelecanus occidentalis californicus</i>	California brown pelican	E	E	A,B,C,D,E
<i>Sterna antillarum browni</i>	California least tern	E	E	B,C,D
<i>Vireo bellii pusillus</i>	Least Bell's vireo	E	E	—
Mammals				
<i>Callorhinus ursinus</i>	Northern fur seal	—	Marine Mammal Protection Act	A,C,D,E
<i>Enhydra lutris nereis</i>	Southern sea otter	Recognized Threatened	T	C,E
<i>Mirounga angustirostris</i>	Northern elephant seal	—	Marine Mammal Protection Act	A,C,D,E
<i>Phoca vitulina richardii</i>	Pacific harbor seal	—	Marine Mammal Protection Act	A,C,D,E
<i>Zalophus californianus</i>	California sea lion	—	Marine Mammal Protection Act	A,C,D,E
Plants				
<i>Cirsium rothophilum</i>	Surf thistle	T	C	A,B,C,D,E
<i>Eriodictyon capitatum</i>	Lompoc yerba santa	R	C	C
<i>Layia carnosa</i>	Beach layia	E	E	D
<i>Rorippa gambellii</i>	Gambel's watercress	E	E	C

**Table 3-2: Listed Species Known or Expected to Occur at or in the Vicinity of  
Vandenberg Air Force Base (Continued)**

Scientific Name	Common Name	Status		Launch Sites
		State	Federal	
WILDLIFE SPECIES EXPECTED TO OCCUR				
Ambystoma californiense	California tiger salamander	CSC	C	N/A

Source: California Polytechnic State University, Biological Sciences Department, 1995; Chapman, 1996b; Christopher, 1995; U.S. Department of the Air Force, 1989a, 1991a,b; Vandenberg Air Force Base, 1993, 1996a; Zane Publishing, Inc., 1995.

NOTES:

–	Not listed	T	Threatened
CSC	California species of concern	C	Candidate
E	Endangered	PE	Proposed endangered

Status Definitions

California Species of Concern—Native species or subspecies that have become vulnerable to extinction because of declining population levels, limited ranges, or rarity. The goal is to prevent these animals from becoming endangered by addressing the issues of concern early enough to secure long-term viability for these species.

Endangered—A native species or subspecies that is in serious danger of becoming extinct throughout all, or a significant portion, of its range.

Threatened—A native species or subspecies that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of special protection and management efforts.

Candidate—A native species or subspecies that has been formally noticed as being under review for addition to either the list of endangered species or the list of threatened species, or a species for which a notice has been published concerning proposed regulation to add the species to either list.

**Table 3–3: Sensitive Species Known or Expected to Occur at or in the Vicinity of  
Vandenberg Air Force Base**

Scientific Name	Common Name	Status		Launch
		State	Federal	Sites
<i>Insects</i>				
<i>Icaricia icarioides moroensis</i>	Morro Bay blue butterfly	–	S	B,C
<i>Fish</i>				
<i>Gila orcutti</i>	Arroyo chub	–	S	C
<i>Amphibians</i>				
<i>Spea hammondii</i>	Western spadefoot toad	CSC	S	B,C
<i>Reptiles</i>				
<i>Anniella pulchra pulchra</i>	Silvery legless lizard	CSC	S	C
<i>Clemmys marmorata pallida</i>	Southwestern pond turtle	CSC	S	C,D
<i>Phrynosoma coronatum frontale</i>	California horned lizard	CSC	S	C,D,E
<i>Thamnophis hammondii</i>	Two-striped garter snake	–	S	C,D

Table 3-3: Sensitive Species Known or Expected to Occur at or in the Vicinity of Vandenberg Air Force Base (Continued)

BIRDS				
<i>Ageisus tricolor</i>	Tri-colored blackbird	—	S	C
<i>Aimophila ruficeps canescens</i>	Southern California rufous crowned sparrow	—	S	A,B,D,E
<i>Amphispiza belli belli</i>	Bell's sage sparrow	—	S	C, D
<i>Aquila chrysaetos</i>	Golden eagle	CSC	Bald & Golden Eagle Protection Act	—
<i>Buteo regalis</i>	Ferruginous hawk	CSC	S	—
<i>Ixobrychus exilis hesperis</i>	Western least bittern	CSC	S	—
<i>Plegadis chihi</i>	White-faced ibis	CSC	S	—
<i>Speotyto cunicularia hypugea</i>	Western burrowing owl	CSC	S	E
<i>Sterna elegans</i>	Elegant tern	—	S	—
PLANTS				
<i>Cordylanthus rigidus</i> ssp. <i>Littoralis</i>	Seaside birds-beak	E	—	
<i>Dithyrea maritima</i>	Beach spectacle pod	T	—	
WILDLIFE SPECIES EXPECTED TO OCCUR				
<i>Empidonax trailii brewsterii</i>	Little willow flycatcher	—	S	UNK
<i>Euderma maculatum</i>	Spotted bat	—	S	UNK
<i>Eumops peratis californicus</i>	Greater western mastiff bat	—	S	UNK
<i>Lichnanthe albopilosa</i>	White sand dune scarab beetle	—	S	UNK
<i>Myotis ciliolabrum</i>	Small-footed myotis	—	S	UNK
<i>Myotis evotis</i>	Long-eared myotis	—	S	UNK
<i>Myotis thysanodes</i>	Fringed myotis	—	S	UNK
<i>Myotis volans</i>	Long-legged myotis	—	S	UNK
<i>Myotis yumanensis</i>	Yuma myotis	—	S	UNK
<i>Passerculus sandwichensis beldingi</i>	Belding's savannah sparrow	—	S	UNK
<i>Passerculus sandwichensis rostratus</i>	Large-billed savannah sparrow	—	S	UNK
<i>Plecotus townsendii</i>	Pacific Townsend's (western) big-eared bat	CSC	S	UNK

Source: California Polytechnic State University, Biological Sciences Department, 1995; Chapman, 1996b; U.S. Department of the Air Force, 1989a, 1991a:b; Vandenberg Air Force Base, 1993b, 1996; Zane Publishing, Inc., 1995.

NOTES:

–	Not listed	S	Sensitive
CSC	California species of concern		

## Status Definitions

Sensitive—Species for which currently available information does not support proposed listing

California species of concern - Native species or subspecies that have become vulnerable to extinction because of declining population levels, limited ranges, or rarity. The goal is to prevent these animals from becoming endangered by addressing the issues of concern early enough to secure long-term viability for these species.

Sensitive species sighted within specific launch group regions are further explained under their respective headings.

### North Vandenberg Air Force Base

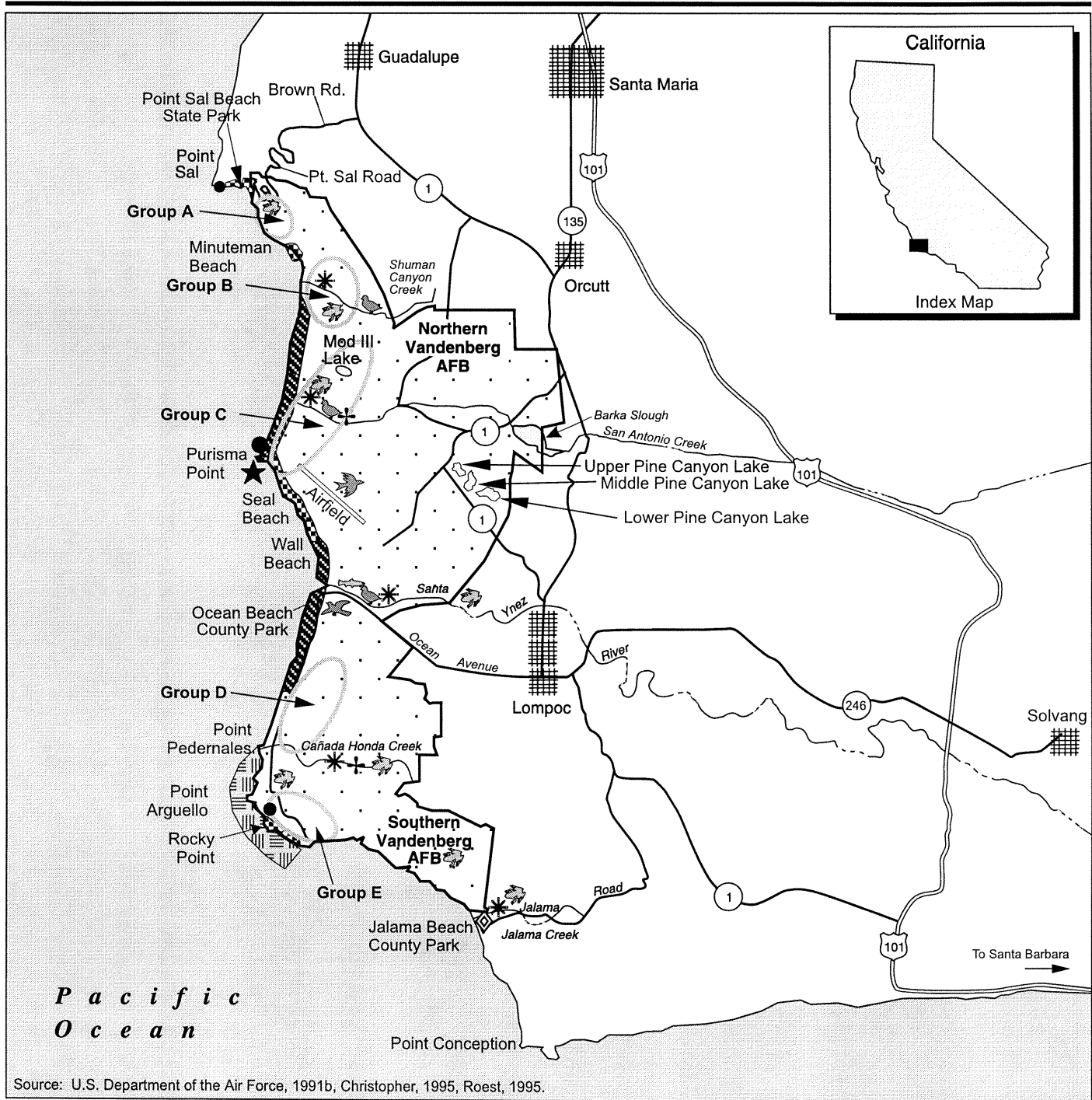
**Groups A and B.** These launch facilities are located in a grasslands community situated in Vandenberg's northernmost portions; LF-06, for instance, is only about 274 meters (900 feet) from the coast. Vegetation primarily consists of grasses and small herbs, such as sea rocket (*Cakile maritima*), sand verbena (*Abronia maritima*), heliotrope (*Heliotropium curassavicum* v. *oculatum*), and phacelia (*Phacelia ramosissima* v. *austrolitoralis*). In certain areas, the force of wind shear is indicated by the comparatively stunted growth of many floral species (U.S. Department of the Air Force, 1991b).

Located some 3.2 kilometers (2 miles) south of LF-06 is Shuman Canyon Creek, at whose mouth can be found one of the northernmost on-base locations for the surf thistle (a recorded population in the Point Sal area is believed to have been outside Vandenberg boundaries). It can be found on sparsely vegetated dunes along beaches continuing south of Shuman Canyon. (California Polytechnic State University, Biological Sciences Department, 1995)

Common wildlife species in the area include pocket gophers (*Geomys* spp.), California ground squirrels (*Spermophilus beecheyi*), rabbit (*Sylvilagus* sp.), and mule deer. Ring-billed (*Larus delawarensis*), western (*L. occidentalis*), and Heerman's (*L. heermani*) gulls, as well as red-tailed hawks (*Buteo jamaicensis*) and golden eagle (*Aquila chrysaeton*), have also been sighted (U.S. Department of the Air Force, 1991b).

The tidewater goby (*Eucyclogobius newberryi*), a Federal and California Department of Game and Fish endangered species, occurs in Shuman Canyon Creek. The California red-legged frog (*Rana aurora*), Federally listed as threatened, is found in riparian wetland areas in the northwestern Vandenberg AFB portion (U.S. Department of the Air Force, 1988a). It prefers freshwater pools and ponds associated with arroyo willow (*Salix lasiolepis*), cattails (*Typha* spp.), and other thickets of emergent aquatic vegetation (U.S. Department of the Air Force, 1995).

Shuman Canyon Creek offers foraging areas for the state and Federally listed endangered California least tern (*Sterna antillarum brownii*); these seabirds preferentially forage in near-shore and coastal areas replete with adequate supplies of prey fish (U.S. Department of the Air Force, 1992). The California brown pelican (*Pelecanus occidentalis californicus*), a Federal and state endangered subspecies, and the western snowy plover (*Charadrius alexandrinus nivosus*), a Federal threatened shorebird, are commonly observed in the Vandenberg area, which provides winter roosting for the former and nesting and roosting sites for the latter (U.S. Department of the Air Force, 1991b). Near Group A sites, the pelicans can be found roosting at Point Sal; nesting plovers can be found in coastal areas near the Group B launch sites (figure 3-2). There is also a documented 1989 sighting of the Federal and state endangered American peregrine falcon (*Falco peregrinus*) in the Point Sal area. The raptor has been the subject of an active state reintroduction program since the 1970s (U.S. Department of the Air Force, 1990a), that undoubtedly accounts for the increase in on-base sighting in recent years.



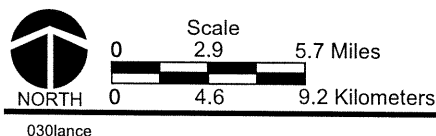
#### EXPLANATION

- |  |   |   |
|--|---|---|
| Nesting Location of California Least Tern/ Western Snowy Plover                          | Tidewater Goby                                | California Least Tern (CLT) Foraging Areas  |
| Haulout Location of California Sea Lion, Northern Elephant Seal, and Pacific Harbor Seal | Unarmored Threespined Stickleback             | California Red-legged Frog (Wide Distribution Also Includes Ponds and Vernal Pools) |
| Marine Ecological Reserve  | Roosting Location of California Brown Pelican | Steelhead Trout   |
|  | Southern Sea Otters                           | Mountain Plover (Winters Only)  |
|  | Launch Site Areas                             | Southwestern Willow Flycatcher  |
|  |   | Snowy Plover (Winters Only)   |

### Sensitive Habitat for Listed Faunal Species on Vandenberg AFB

Western Range Candidate Test Area

Figure 3-2



TBM Targets EA

The Pacific harbor seal is also a resident of Point Sal and Lion's Head. Other pinnipeds can be found in nearby haulout/rookery areas, preferring undisturbed sections of mainland coast and offshore islands or rocks, as seen in figure 3-2.

**Group C.** The Rail Garrison and Test Pad-01 launch sites are situated on the San Antonio Terrace, which is located within, and adjacent to, the largest expanse of stabilized sand dunes on Vandenberg (U.S. Department of the Air Force, 1991b). Within this area, swales (low areas), dune, grassland, and freshwater wetland are all represented. Despite the occasional presence of coast live oak (*Quercus agrifolia*), found in open areas, and trees surrounding wetlands, terrace vegetation is essentially low-growing. Representative plants include coastal lupine (*Lupinus arboreus*), mock heather (*Ericameria ericoides*), cudweed-aster (*Lessingia filaginifolia*), common phacelia (*Phacelia* spp.), beach grass (*Ammophila arenaria*), veldt grass (*Ehrharta calycina*), seacliff buckwheat (*Eriogonum parvifolium*), and sticky monkey flower (*Mimulus aurantiacus*).

Along with a network of swales, several wetlands (including two man-made) occur near the Test Pad-01 area. The closest is approximately 100 meters (328 feet) southeast of the Rail Garrison. Mostly ranging between 0.81 and 2.83 hectares (2 and 7 acres) in size, these wetlands support such typical species as arroyo willow, wide-leaf cattail (*Typha latifolia*), California bulrush (*Scirpus californicus*), water smartweed, and bog rush.

The area immediately adjoining the launch sites is highly disturbed and supports ruderal vegetation consisting of mustards (*Brassica* spp.), wild oats (*Avena fatua*), and veldt grass.

Also present is a heavily impacted area of coastal dune scrub, dominated by giant ryegrass (*Leymus condensatus*), deerweed, mock heather, and lupine.

The Rail Garrison/Test Pad-01 sites and surrounding vegetation supply habitat for resident wildlife species of native scrub, open grassland, and wetland areas, including Pacific tree frog (*Pseudacris regilla*), common yellowthroat (*Geothlypis trichas*), California (*Peromyscus californicus*) and brush (*P. boylii*) mouse, dusky-footed woodrat (*Neotoma fuscipes*), and coyote (*Canis latrans*).

The most common habitat types around the 576-E and ABRES A-1, -2, and -3 sites are coastal sage scrub, chaparral, and introduced annual grassland. These launch facilities are located near or within a sensitive vegetation community known as Burton Mesa chaparral, unique in that it includes several endemic plants and Lompoc yerba santa. This is one of the only three stands of the rare plant known on Vandenberg. The other two are located within Bishop pine forest in and around Pine Canyon (California Polytechnic State University, Biological Sciences Department, 1995).

The presence of Burton Mesa chaparral habitat is viewed as a high constraint to development; however, the original vegetation of the actual launch sites (surrounded by chain-link fencing) was disturbed or removed during initial construction, and only a few remnants of native coastal habitat remain.



A steep arroyo, containing wetlands with high-quality wildlife habitat and supporting a variety of food sources, runs diagonally from southeast to northwest through the middle of this area (U.S. Department of the Air Force, 1989a; 1991b). Typical flora include scruffy-leaved croton (*Croton californicus*), hottentot fig (*Carpobrotus edulis*), sand lettuce (*Dudleya caespitosa*), and weedy sawtooth goldenbush (*Hazardia squarrosa*) (U.S. Department of the Air Force, 1991b; 1992).

Over 40 bird species, such as the great horned owl (*Bubo virginianus*), red-tailed hawk, burrowing owl, cliff swallow (*Petrochelidon pyrrhonota*), and Common bushtit (*Psaltiriparus minimus*), are commonly located in the areas surrounding the Group C sites (U.S. Department of the Air Force, 1989a; 1991b). Several mammal species, such as the agile kangaroo rat (*Dipodomys agilis*), striped skunk (*Mephitis mephitis*), desert cottontail (*Sylvilagus bachmani*), beaver (*Castor canadensis*), and feral pig (*Sus scrofa*) may also be found.

Approximately 1,067 meters (3,500 feet) south of the Test Pad-01/Rail Garrison sites (and some 670.5 meters [2,200 feet] north of the ABRES A-3 site) is San Antonio Creek, one of the largest streams on base. Several freshwater marshes have been recorded along the San Antonio. These marshes, along with the creek itself and the lagoon at its mouth, are frequented by both common and rare Vandenberg species (U.S. Department of the Air Force, 1991b); the unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*), a Federal and state endangered fish, the tidewater goby, and the California red-legged frog can be found there. This may represent the northern limit for the stickleback (U.S. Department of the Air Force, 1992), which utilizes adjoining feeder streams during the wet season. The dune areas just north and south of the creek's mouth are also home to scattered populations of surf thistle (California Polytechnic State University, Biological Sciences Department, 1995).

Also south of Test Pad-01 (on the southern edge of San Antonio Terrace) is Mod III Lake. This man-made lake's fish, such as *gambusia*, are all introduced species. The California red-legged frog is located here (U.S. Department of the Air Force, 1988a) and in surrounding riparian areas, as well as in freshwater ponds neighboring the Rail Garrison and ABRES A sites (Vandenberg Air Force Base, 1996a) and Barka Slough (Christopher, 1995).

Periodic foraging is available to the Federal endangered California least tern around Mod III Lake and at the mouth of the San Antonio (U.S. Department of the Interior, 1994). Historically, this sea bird has established nesting colonies in that area, as well as at Purisima Point, some 2.4 kilometers (1.5 miles) northwest of launch site 576-E and approximately 4.5 kilometers (2.8 miles) southwest of the ABRES A sites. Preferred nesting sites are broad, flat, open sand beaches, entirely devoid of vegetation (U.S. Department of the Air Force, 1995); the nesting season lasts from mid-April to August (table 3-4). The Mountain plover (*Charadrius montanus*), a Federal candidate species, winters annually in the area of the Vandenberg airfield. No other known Vandenberg locations exist for this species. California brown pelicans are also known to utilize areas within the Group C vicinity (particularly Purisima Point), as are western snowy plover. An American peregrine falcon was observed at Purisima Point in 1986 (U.S. Department of the

Air Force, 1990a), and has been noted around the San Antonio (U.S. Department of the Air Force, 1995), but the raptor is not considered a common sight in the area.

**Table 3–4: Pupping and Breeding Seasons For Sensitive Species**

	Species	Pupping/Breeding Season	Applicable Launch Sites
<i>Marine Mammals</i>			
1	California sea lion	Mid-May–Late June	Group A, Group C, Group D, Group E
2	Guadalupe fur seal	N/A	Group A, Group C, Group D, Group E
3	Northern elephant seal	Late December–Mid-February	Group A, Group C, Group D, Group E
4	Northern fur seal	Late May–July	Group A, Group C, Group D, Group E
5	Pacific harbor seal	February–May	Group A, Group C, Group D, Group E
6	Southern sea otter	Peak pupping: January–March Peak breeding: July–October	Group C
7	Steller sea lion	Early June–Early July	Group A, Group C, Group D, Group E
<i>Birds</i>			
8	American peregrine falcon	mid-February–July	Group D, Group E
9	California brown pelican	February–April	Group A, Group B, Group C, Group D, Group E
10	California least tern	mid-April–August	Group B, Group C, Group D
11	Southwestern willow flycatcher	mid-May–mid-July	Group D
12	Western snowy plover	March–September	Group B, Group C, Group D

Source: Zane Publishing, Inc., 1995; Vandenberg Air Force Base, 1996a.

Note: The flycatcher is known only along the Santa Ynez River, where its only documented recent nesting has occurred near the 13<sup>th</sup> Street Bridge and off-base.

A resident population of Federally threatened Southern sea otters has been observed off Purisima Point, typically foraging and rafting in kelp beds; however, semi-migratory individuals may be found all along the coastline. Possibly indicative of a habitat expansion (U.S. Department of the Air Force, 1992), this colony has been confirmed as a small breeding population (U.S. Department of the Air Force, 1995). The kelp beds are located about 1.16 kilometers (3,800 feet) west of the 576-E site (U.S. Department of the Air Force, 1993a), which abuts a haulout location for Pacific harbor seals and, rarely, California sea lions and northern elephant seals.

### **South Vandenberg Air Force Base**

A general description of vegetation and wildlife present on Vandenberg AFB is given in section 3.2.1. On the whole, South Vandenberg is much less developed than the northern areas and thus more conducive to wildlife diversity. Recently, breeding of the American peregrine falcon has been documented in the area, where preferred aerie sites are protected, typically seaward-facing, coastal cliff ledges. However, the species is not represented in figure 3-2 due to a request by the USFWS (Vandenberg Air Force Base, 1993; U.S. Department of the Interior, 1994).

The State of California has designated a 4.8-kilometer (3-mile) area of South Vandenberg as a marine ecological reserve, but this was not intended as a restriction against launch operations. Rather, a Memorandum of Agreement (MOA) between the state and the base

has been initiated that would allow access to the area to military operations and scientific research only (U.S. Department of the Air Force, 1995). The area extends from Oil Well Canyon to Point Pedernales (figure 3-2).

**Group D.** The existing SLC-5 facility, located some 914.4 meters (3,000 feet) from the coast, inhabits hilly terrain within a coastal sage scrub plant community bordering a stabilized coastal dune. Cañada Honda Creek riparian vegetation occurs near the facility (the creek, itself, is due south of SLC-5), which occupies a relatively small percentage of the area (U.S. Department of the Air Force, 1991b). Coastal dune scrub becomes more prominent to the west of SLC-5, toward the coast, and here crisp monardella (*Monardella crispera*) may be found in disturbed sand dunes (U.S. Department of the Air Force, 1995). Grounds within the perimeter fence, having been previously disturbed, contain ruderal vegetation. Species expected to occur include coastal sagebrush, lemonade berry (*Rhus integrifolia*), buckwheat (*Eriogonum* sp.), and various grasses. (U.S. Department of the Air Force, 1992)

SLC-3W is located within the dune area, south of the Santa Ynez River and bordered by grassland. The rare beach layia, a winter annual, is found as one isolated colony in the Group D vicinity (U.S. Department of the Air Force, 1992) west of SLC-3W and northeast of SLC-5. Populations of surf thistle are known in foredune and sandy bluff areas at the mouth and south of the Santa Ynez, less than 1.6 kilometers (1 mile) northeast of Point Pedernales, north of Ocean County Beach, and near the Vandenberg AFB entrance (California Polytechnic State University, Biological Sciences Department, 1995).

Wildlife in the area include such common on-base species as western fence lizard, striped skunk, house finch (*Carpodacus mexicanus*), and red-tailed hawk (U.S. Department of the Air Force, 1991b). Morro Bay blue butterflies (*Icaricia icarioides moroensis*) may also occur in the area in habitats such as salt marsh and coastal dunes (U.S. Department of the Air Force, 1989b). To date, however, this insect has only been located in the San Antonio Terrace area (Chapman, 1996b).

The Santa Ynez River has the most populous and diverse vertebrate fauna of any stream on Vandenberg (U.S. Department of the Air Force, 1991b). A relatively extensive coastal salt-marsh, surrounding a 23.4-hectare (58-acre) lagoon, occurs at its mouth. Common fish of the river include bass (*Micropterus* spp.), fathead minnow (*Pimphales promelas*), introduced arroyo chub (*Gila orcutti*), and *gambusia*. The somewhat brackish lagoon supports starry flounder (*Platichthys stellatus*) and Pacific staghorn sculpin (*Leptocottus armatus*). (U.S. Department of the Air Force, 1989b)

The Federally proposed endangered steelhead trout (*Oncorhynchus mykiss*), once an abundant breeder, still inhabits the Santa Ynez, though in considerably smaller numbers. The tidewater goby can be found in shallow portions of the river channels (U.S. Department of the Air Force, 1995), as well as the lagoon area. Recent surveys also indicate the presence of the California red-legged frog (Christopher, 1995). The goby can also be found in Cañada Honda Creek, the largest drainage in South Vandenberg, as can the unarmored threespine stickleback (introduced in 1984) and the California red-legged frog. Occurring in suitable wetland habitats within the Group D region, the frog also frequents the nearby SLC-6 sewage ponds (Vandenberg Air Force Base, 1996a). The

steelhead trout is considered a potential inhabitant of Cañada Honda creek (Chapman, 1996b).

In addition to the aforementioned sites, the California least tern has also been known to forage at and establish nesting colonies near the mouth of the Santa Ynez (U.S. Department of the Interior, 1994) and on islands along the north shore of the river's estuary (U.S. Department of the Air Force, 1990a). The SLC-3W site is located near the nesting area of the Western snowy plover (figure 3-2), which extends from 1.77 kilometers (1.1 miles) north of the Santa Ynez lagoon to approximately 2.4 kilometers (1.5 miles) south (U.S. Department of the Air Force, 1988a). The Federal endangered southwestern willow flycatcher (*Empidonax traillii extimus*) also frequents the Santa Ynez. Previously, the flycatcher's only known breeding colony in the region was documented in dense willow riparian woodlands along this river, but outside of base boundaries (U.S. Department of the Air Force, 1990a). The flycatcher is now known to nest along the river near the 13<sup>th</sup> Street Bridge; other potential on-base habitat is available.

Though a rare and occasional visitor, sightings of a juvenile bald eagle at the mouth of the Santa Ynez have occurred between December 1993 and March 1994 (U.S. Department of the Interior, 1994); this area of the river also provides hunting for the American peregrine falcon and roosting for the California brown pelican, which may also feed in the lagoon (U.S. Department of the Air Force, 1988a; 1989b). Hunting peregrines have also been observed in the nearby SLC-6 area (U.S. Department of the Air Force, 1990a).

The Pacific harbor seal is a resident of coastal areas near the Group D sites.

**Group E.** V-33 is located near coastal sage scrub community. These communities are adapted to periodic burning and many of the plants species readily resprout after fire; however, more frequent and intense disturbances allow weeds and exotic species to supplant native vegetation (U.S. Department of the Air Force, 1995).

Suitable habitat for the surf thistle occurs near the V-33 area. Colonies are predominately located on the north sides of Point Arguello and Rocky Point and on foredunes between 1.2 and 1.9 kilometers (0.75 and 1.2 miles) north of Point Arguello. (California Polytechnic State University, Biological Sciences Department, 1995; U.S. Department of the Air Force, 1989a; 1991b)

The region has been employed for cattle grazing for over 60 years (U.S. Department of the Air Force, 1995). Previous heavy grazing and development have combined to reduce the wildlife habitat value of the immediate area (U.S. Department of the Air Force, 1990a). Nevertheless, red-tailed hawks, pocket gophers, California ground squirrels, broad-footed moles (*Scapanus latimanus*), and domestic cattle (genus *Bos*) continue to exploit the site for foraging or feeding (U.S. Department of the Air Force, 1990a; 1991b; 1992). Nearby Point Arguello offers nesting for many seabirds, including western gull and rhinoceros auklet (*Cerorhinca monocerata*). Regionally rare and declining species observed in the area include the burrowing owl and the badger, both presented with excellent habitat due to the presence of the ground squirrels: their abandoned burrows have been utilized by the owls, and the squirrels themselves are a major prey item in the owl's and the badger's diet (Terres, 1980; U.S. Department of the Air Force, 1990a).

California red-legged frogs have been sighted east of the Group E sites, in Cañada del Joijoru (Christopher, 1995).

The California brown pelican is known to roost near Point Arguello, Rocky Point, the Boathouse Breakwater, and the V-33 site. Year-round residents, American peregrine falcons nest in the Group E vicinity between Point Arguello and Point Conception. California least terns forage in adjacent offshore waters. (U.S. Department of the Air Force, 1990a; 1995)

Southern sea otters are known to feed offshore in kelp beds near the V-33 area, though there are no permanent populations along South Vandenberg at this time (U.S. Department of the Air Force, 1995). The V-33 site borders Rocky Point, a haulout or pupping location for the Pacific harbor seals, the California sea lion (an occasional visitor) and the northern elephant seal. Harbor seals have also been noted near Point Arguello and the Boathouse Breakwater (U.S. Department of the Air Force, 1995).

### 3.3 CULTURAL RESOURCES

#### Region of Influence

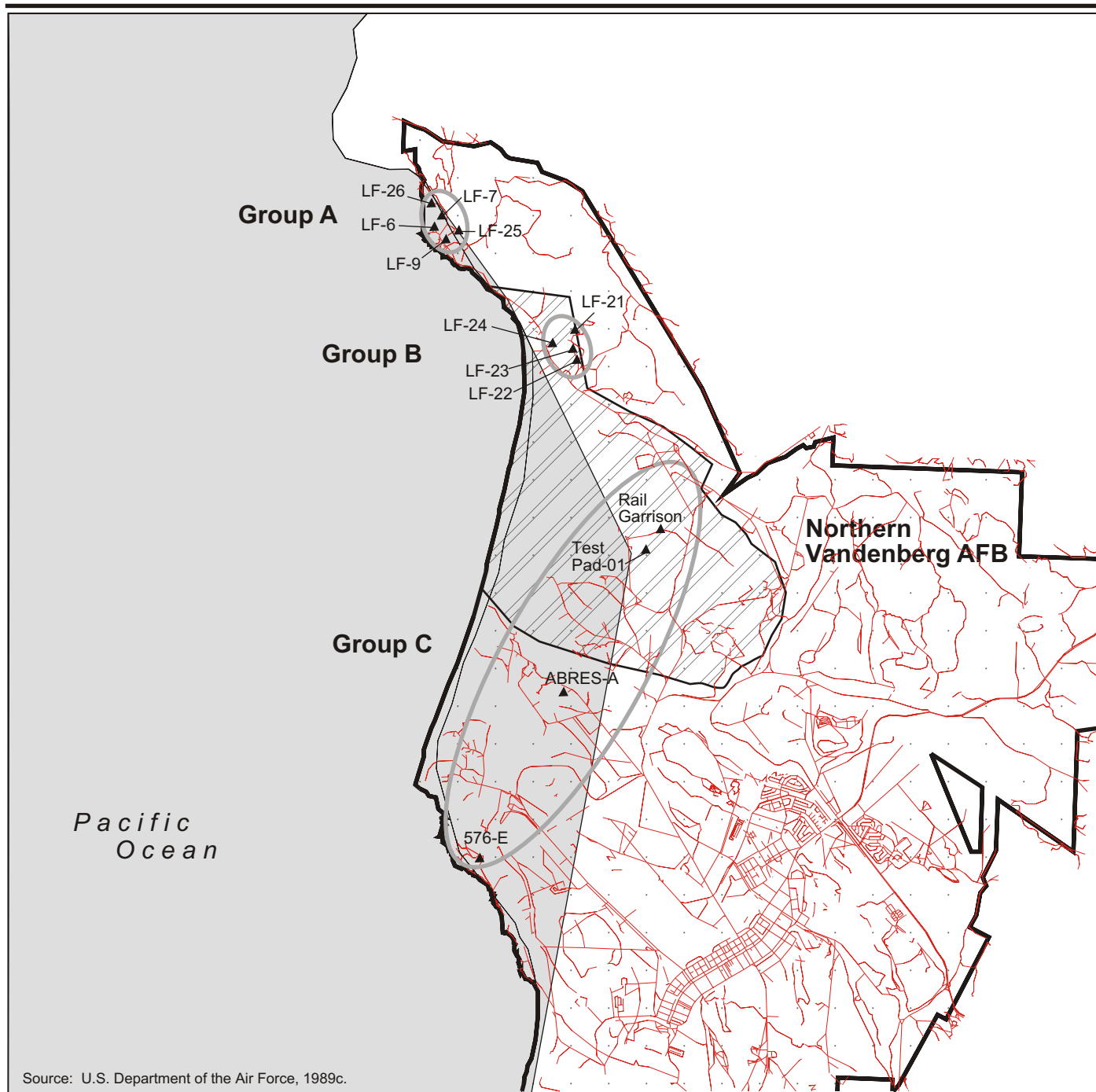
The ROI for cultural resources incorporates the immediate launch site and all LHAs.

#### Affected Environment

To provide a context for the types and quantities of cultural resources known and that have the potential to occur within the ROI, a summarization of the broad patterns of human occupation in the area is presented.

**Archeological Resources.** The Santa Barbara culture region encompasses the ROI, and San Clemente and San Nicolas islands. Archeological investigations on present-day Vandenberg AFB began in 1874, and some 700 recorded cultural resource sites exist on base (U.S. Department of the Air Force, 1990c). The earliest evidence of human occupation within the ROI appears in the archeological record circa 7000 B.C. (U.S. Department of the Air Force, 1996). Regional chronology divides Vandenberg AFB prehistory into three periods: Early (6000 to 1400 B.C.), Middle (1400 B.C. to A.D. 1100), and Late (1100 to 1800 A.D.) (U.S. Department of the Air Force, 1990b). Since most archeological sites contain data relevant to a common research theme, a Historic Preservation Plan has been developed to manage the San Antonio Terrace National Register District (figure 3-3); 146 prehistoric archeological sites are known within the district (U.S. Department of the Air Force, 1988b, 1996).

During the late prehistoric and historic periods, the Vandenberg AFB region was inhabited by Chumash Indian tribes (U.S. Department of the Air Force, 1980), a maritime-adapted hunting and gathering people. Evidence of cultural remains include recorded village, camp, processing, manufacturing, and quarry sites.



#### EXPLANATION

 Archaeological District

 Candidate Launch Site

### Location of San Antonio Terrace Archaeological District



Vandenberg, AFB

**Figure 3-3**

**Historic Resources and Structures.** Regional Spanish influence began after 1722 with the building of missions in Chumash territory to which the missionaries moved the Indians after their conversion to Christianity. Here they were schooled in farming and European crafts. (U.S. Department of the Air Force, 1990b)

Military use of the area began in March 1941, when the Army acquired 36,423 hectares (90,000 acres) of land in present day North Vandenberg to create Camp Cooke, activated in October (U.S. Department of the Air Force, 1989c; 1995). In mid-1957, the U.S. Air Force took over the north half of the present base, renaming it Vandenberg AFB in October of the following year. With the acquisition of the Navy's Point Arguello Launch Complex and, in the early 1960s, the Sudden Ranch homestead (in what is now South Vandenberg), the present-day Vandenberg land boundaries were completed (U.S. Department of the Air Force, 1989c).

Beginning in 1959, weapons from the intercontinental ballistic missile (ICBM) arsenal were flight tested on base (U.S. Department of the Air Force, 1988b). Some of the facilities employed at that time, having not yet attained a 50-year age, may yet demonstrate exceptional importance via either the Man-in-Space theme, the Cold War historic context, or exceptional scientific and technological achievement. These are the most common ways in which a military property might be considered potentially eligible for listing on the National Register.

**Traditional Resources.** Turtle Pond on the San Antonio Terrace is considered by the Santa Ynez Band of Mission Indians (Chumash) to be a traditional resource area (U.S. Department of the Air Force, 1988b).

**Paleontological Resources.** Paleontological resources found in the ROI vicinity include both vertebrate and invertebrate fossils.

### **North Vandenberg Air Force Base**

**Groups A and B.** Cultural resource sites located in this area include the site of the former Rancho Guadalupe, which dates from the Mission period. The Miocene Monterey Formation and Later Miocene deposits identified at northern Vandenberg AFB have yielded imprints of algae, fish fragments, coprolite, and whalebone (U.S. Department of the Air Force, 1996).

**Group C.** Test Pad-01 is located in the center of the San Antonio Terrace National Register District. The District has 146 recorded archeological sites. The ABRES A sites are located on Burton Mesa, in an area of very high archeological sensitivity. Facility 576-E has previously been subjected to disturbance from past operation activities; a 1991 cultural resources review and site survey indicated cultural material (19 prehistoric, archeological sites) in proximity to, but not directly beneath, this facility. Furthermore, no cultural material was found in the area of potential impacts for 576-E and it is believed any such resources near the site's ground surface would have either been removed or disturbed during its construction (U.S. Department of the Air Force, 1992). Though at one point the possibility of listing 576-E as a Cold War/highly scientific historical site was considered, it was determined to be ineligible.

The Group C region includes the site of Camp Cooke, used for World War II training and maneuvers and, after 1944, as a German-Italian prisoner-of-war camp (the most noteworthy of which included elements of Field Marshall Rommel's Afrika Korps); camp facilities were located on Burton Mesa. The camp, in turn, had assumed control of the former Rancho Jesús María. At nearby Purisima Point is SLC-10, both an inactive THOR Intermediate Range Ballistic Missile launch facility and a National Historic Landmark (U.S. Department of the Air Force, 1992).

### **South Vandenberg Air Force Base**

Remnants of terrestrial upper-Pleistocene terrace deposits have been found at South Vandenberg. These deposits have great potential for fossil discovery, yielding mammoth and horse fossils approximately 45,000 years old. In addition, fish and crab remains and whalebone have been discovered (U.S. Department of the Air Force, 1989c).

**Group D.** At least two archeological sites and one historical site are located south of SLC-5. The SLC-3W and -5 sites are within the territory historically occupied by the Purisimeño group of the Chumash.

**Group E.** Seven prehistoric and historical sites are located in the area, including a former Coast Guard Rescue Station known as the Boathouse, another Coast Guard station at Point Arguello, and a chert quarry (U.S. Department of the Air Force, 1992; 1995). All are eligible for inclusion in the National Register. The ground surface in the Boathouse area has been previously extensively disturbed by various construction and maintenance activities (U.S. Department of the Air Force, 1992).

## **3.4 HAZARDOUS MATERIALS AND WASTE**

The State of California has assumed responsibility for regulation of all activities previously regulated by the EPA. California has adopted the requirements found in the Federal regulations, which are rewritten in Title 22 of the California Code of Regulations.

### **Region of Influence**

The ROI for hazardous materials and waste at Vandenberg AFB includes the entire base and locations within a few miles of the facility.

### **Affected Environment**

**Hazardous Materials Activities.** Due to the diversity in missions performed at Vandenberg AFB, a wide variety of hazardous material types and quantities are in use. Their utilization must conform with Federal, DOD, and Air Force hazardous materials management requirements. Hazardous materials are tracked by Entrack System personnel (30 LSS/LGSDH) within Vandenberg's Logistic Group (Chapman, 1996b). Such materials fall into two basic use categories: materials used in facility maintenance activities and those used in various missile test operations.

The utilization of all hazardous materials is subject to ongoing inspection by Vandenberg AFB Logistics Group personnel (30 LG/LGSPH) and 30 SW/SE personnel to ensure safe



handling (Chapman, 1997). The majority of these materials are consumed in operational processes, leaving the remainder to be collected as hazardous waste.

Hazardous materials used in base infrastructure support include various cleaning solvents (chlorinated and non-chlorinated) and fluids, paints, pesticides, motor fuels and other petroleum products, freon (for air conditioning), and other materials. These materials arrive at Vandenberg via typical freight delivery routes (truck, rail, air), after which they may be issued to individual users through the facility supply system. These users provide storage of all materials in accordance with established procedures applicable to individual operations.

Range testing operations, such as missile launches, also employ a wide variety of hazardous materials. Cleaning solvents (chlorinated and non-chlorinated) and freons, various painting compounds, explosive materials, and toxic propellants are typical examples, though their types and quantities vary depending upon specific system and test-configuration requirements. Hazardous materials used in conjunction with these programs are brought on base by the agency responsible for testing the individual systems. Each agency utilizing Vandenberg AFB is responsible for procurement, distribution, and management of its hazardous materials, which must conform to the requirements of Vandenberg AFB hazardous waste management procedures.

Users of hazardous materials are responsible for the costs of proper collection and disposal of all hazardous waste generated as a result of their on-base activities, including both that generated during pre-flight activities and waste generated during test operations (for example, flight component debris). Attempts are made to recover such debris where possible and recovery, sponsored by the test agency, includes both test article debris and explosive ordnance (as applicable).

**Hazardous Waste Activities.** Vandenberg AFB regulations, particularly the *Hazardous Waste Management Plan* (dated 15 August 1994), specify all procedures for packaging, handling, transporting, and disposing of hazardous waste (Chapman, 1996b). Hazardous waste generated during Vandenberg activities is initially collected at the point of origination and transported to the collection-accumulation point (CAP) (managed by the base Compliance Programs Office in Civil Engineering [(30 CES/CEVCC)], where it is containerized and segregated by type (Chapman, 1997). Following initial containerization, waste may remain at the CAP (building 3300) for up to 90 days, at which point all hazardous waste must be transported to the Vandenberg Hazardous Waste Storage Area, operated by the Defense Re-utilization and Marketing Office. Vandenberg AFB is currently on Resource Conservation and Recovery Act interim permit status, in which application for permanent status has been made through the Department of Toxic Substances Control (U.S. Department of the Air Force, 1996). This allows on-site storage of hazardous waste at the Hazardous Waste Storage Area for periods in excess of 90 days after initial waste collection.

### **North Vandenberg Air Force Base**

**Group A.** The sites for potential hazardous waste generation for launch group A include LF-06, LF-07, LF-09, LF-25, and LF-26. Waste produced would include minimal amounts of solvents, paints, lubricants, rags, and waste oils, typical of on-site launch activity

refuse (Chapman, 1996b). Motor fuels and cleaning solvents are collected and disposed of routinely (U.S. Department of the Air Force, 1996).

**Group B.** The potential hazardous waste generation sites for launch group B include LF-21, LF-22, LF-23, and LF-24. Wastes generated would be similar to those listed for Group A.

**Group C.** The potential hazardous waste generation sites for launch group C include Test Pad-01; Rail Garrison Peacekeeper; ABRES A-1, -2 and -3; and 576 E. Potential hazardous wastes would be similar to those listed for Group A.

### **South Vandenberg Air Force Base**

**Group D.** The hazardous waste generation sites for launch group D include SLC-3W and SLC-5. Potential hazardous wastes would be similar to those listed for Group A.

**Group E.** V-33 would be a hazardous waste generation site. Potential hazardous wastes would be similar to those listed for Group A.

## **3.5 HEALTH AND SAFETY**

### **Region of Influence**

The ROI for health and safety includes all LHAs and locations off base that may have the potential to be impacted (for instance, by proposed or required evacuation) by proposed activities.

### **Affected Environment**

Vandenberg AFB is involved in the ongoing test and evaluation of various missiles, with safe procedural practices as a primary objective. To accomplish this, an aggressive safety evaluation and control system, developed via 40-plus years experience in test and evaluation, has been implemented.

Proposed on-base program operations must receive prior approval, accomplished by the user through presentation of the program to 30 SW/SE. All safety analyses, SOPs, and other safety documentation applicable to those operations affecting Vandenberg AFB or the Western Range Area and its controlled range space must be provided, along with an overview of mission objectives, support requirements, and schedule. The 30 SW/SE evaluates this information, ensuring that all Western Range Area safety requirements are met.

Preceding operations that may involve ground impact of objects within the range, an evaluation is made to ensure that populated areas, critical range assets, and civilian property susceptible to damage are outside predicted impacts limits. A Notice to Mariners and a Notice to Airmen are published and circulated in accordance with established procedures to provide warning to personnel (including recreational users of the range space and controlled sea areas) concerning any potential impact areas that should be

avoided. Radar and visual sweeps of hazard areas are accomplished immediately prior to operations to ensure evacuation of non-critical personnel.

Prior to missile flight operations, the performance of all target missiles will be evaluated by 30 SW/SE to determine whether or not an FTS is warranted; if so, its use must be in accordance with EWR 127-1. In addition, proposed trajectories are analyzed and a permissible flight corridor is established. A missile that strays outside its corridor is considered to be malfunctioning and to constitute an imminent safety hazard.

As stated earlier, test mishaps for target missiles are defined in terms of three scenarios: missile failure on the launch pad, termination of a flight shortly after liftoff, and termination of a flight after the missile has exited the vicinity of the launch site.

Termination of a flight on the launch pad is characterized by either detonation of the booster or a conflagration in which the propellant burns but does not explode. An ESQD surrounding the launch pad would be calculated based on the equivalent explosive force of all propellant and pyrotechnic materials contained in the flight vehicle. For the current target systems, the ESQD is 381 meters (1,250 feet), a radius which would contain all hazardous debris resulting from a missile failure on the pad. During all launch activities, provisions will be made in accordance with EWR 127-1 to maintain a stand-by emergency response team near the launch site to ensure immediate response and rapid control in the event of an accident.

Termination of a flight shortly after liftoff would result in all hazardous debris being contained within the LHA. Non-essential mission personnel are excluded from this area during launch operations; personnel required to work within LHA boundaries will be protected in hardened shelters, such as bunkers or blockhouses.

In accordance with existing Vandenberg SOPs, 30 SW/SE will ensure that the debris from the termination of a flight will fall into areas verified clear prior to the launch (U.S. Army Space and Strategic Defense Command, 1994b).

The launch scenario will be planned to ensure debris from launch intercepts will not fall within a 4.8-kilometer (3.0-mile) distance of the California coast (U.S. Army Space and Strategic Defense Command, 1994b). Any debris falling on Vandenberg AFB land will be handled in accordance with Vandenberg emergency response plans, based upon the 1996 North American Emergency Response Guidebook (Chapman, 1996b).

## **3.6 LAND USE**

### **Region of Influence**

The ROI for land use includes all LHAs and locations off base that may have the potential to be impacted (for example, through restricted access) by proposed activities.

### **Affected Environment**

Vandenberg AFB, located in western Santa Barbara County in south central California, is within 16 kilometers (10 miles) of the cities of Santa Maria and Lompoc, approximately 88

kilometers (55 miles) northwest of Santa Barbara, and 225 kilometers (140 miles) northwest of Los Angeles (U.S. Department of the Air Force, 1991a). Numerous communities, such as Lompoc, Casmalia, Guadalupe, Santa Maria, Orcutt, Mission Hills, and Vandenberg Village, are located within 8 kilometers (5 miles) of the base, but are separated by wide buffers of agricultural areas (indeed, the county's predominant land uses are agriculture and natural forest); adjacent to Vandenberg Village and along the eastern base boundary is a Federal Correctional Institution. Western Santa Barbara County is largely rural (U.S. Department of the Air Force, 1996).

Less than 5 percent of the base (39,768 hectares [98,265.5 acres]) has been disturbed, leaving the remainder in its natural state as habitat for a diverse assemblage of flora and fauna (U.S. Department of the Air Force, 1989c, 1992). The installation is bounded on the west by 56 kilometers (35 miles) of Pacific Ocean coastline, and occupies approximately 6 percent of the county's total land area (U.S. Department of the Air Force, 1995). The composition of base land uses consists of residential, commercial, industrial, service, and administrative activities, requiring 340 kilometers (520 miles) of roads, 27 kilometers (17 miles) of railroad tracks, and nearly 1,000 buildings (U.S. Department of the Air Force, 1996).

In order to document and classify various land use types to establish and maintain base natural resources and serve as a guide for multiple-use/sustained-yield management, a base land management plan (*Land Management Plan for Vandenberg AFB, CA*, dated June 1992) has been developed. The document is currently being updated, with publication scheduled for June 1997 (Chapman, 1996b). In addition to these guidelines, various Air Force safety regulations, such as the EWR 127-1, *Range Safety Requirements*, dated 31 March 1995, and the *Vandenberg AFB Comprehensive Plan, Santa Barbara Co., CA* (August 1989), restrict on-base development, as do several state and Federal regulations designed to preserve cultural, historical, and environmental integrity. (U.S. Department of the Air Force, 1991a; Chapman, 1996b)

The installation is divided into northern and southern regions by the Santa Ynez River and West Ocean Avenue (see figure 3-2). Area facilities include an airfield, space and defense program test facilities, and launch complexes (U.S. Department of the Air Force, 1992).

## **Recreation**

County and state parks, as well as public access beaches on Vandenberg proper, are some of the few public coastal access points between Gaviota and Point Sal. Three public access beaches exist on, or immediately adjacent to, Vandenberg AFB: Point Sal Beach State Park; Ocean Beach County Park; and Jalama Beach County Park (see figure 3-2). All are especially popular for surf fishing and are open to the public, except during missile launches when access roads can be closed and visitors evacuated under an agreement between the base and Santa Barbara County; currently, this occurs some 15 times a year and closes, at most, two of the beaches simultaneously (Clemente, 1994). All three closure and evacuation agreements have been consolidated under an Evacuation Agreement, No. SPCVAN/1/93/0006, giving the base the right to evacuate and close the beaches not to exceed 48 hours before a launch (Clemente, 1994).

In addition to the state beach and county parks, several coastal areas on Vandenberg AFB itself are open to public use, including Wall Beach, a sandy area extending approximately 2.4 kilometers (1.5 miles) north of Ocean Beach County Park. These beaches provide an important recreational asset to the residents of and visitors to northern Santa Barbara County. Immediately north of the beach area and south of Purisima Point, is Seal Beach, another 5.6 kilometers (3.5 miles) of primarily rocky coastline, where Vandenberg AFB allows limited weekend and holiday access (50 persons per weekend) by permit for surf fishing.

### **North Vandenberg Air Force Base**

Most development is on North Vandenberg AFB and consists primarily of administrative, industrial, and residential facilities. Launch complexes include facilities for Peacekeeper and Minuteman ICBMs. Land use in the area adjacent to the northern boundary of the base is predominantly dedicated to grazing of livestock. (U.S. Department of the Air Force, 1992).

**Groups A and B.** Of the three Vandenberg AFB area public access beaches, Point Sal State Beach is located at the northernmost border of the base; the access road to Point Sal State Beach passes through the North Vandenberg AFB approximately 1.47 kilometers (0.9 mile) from Group A.

**Group C.** Test Pad-01 is located on Rhea Road on North Vandenberg AFB. The facility is located on stabilized sand dunes approximately 2,743 meters (9,000 feet) from the coast. Built in 1982 for the first launch of the Peacekeeper missile from Vandenberg AFB, it is currently an active Air Force System Command site. An aboveground launch mount on a concrete pad is enclosed by a perimeter fence. Water, power, and communications are available at the site, and parking is available adjacent to the site.

Seal Beach, a public access area, is located near 576-E and immediately south of Purisima Point.

### **South Vandenberg Air Force Base**

Most of southern Vandenberg AFB is undeveloped; 99 percent of its land is open space. The remaining 1 percent contains several mountaintop tracking stations, a 61-hectare (150-acre) administrative and industrial area, and four space launch complexes with support facilities (U.S. Department of the Air Force, 1991a). These complexes include facilities for Titan space launch vehicles (U.S. Department of the Air Force, 1992).

**Group D.** Atlas, Titan, and Scout rockets are launched at SLC-3W and -4, with an average combined total of eight launches per year. SLC-5 no longer has an active launch vehicle program. SLC-6 was scheduled to begin launching Lockheed Martin Launch Vehicles in late 1996.

Ocean Beach County Park, at the end of Highway 246, is located approximately mid-way down the western coastal edge of Vandenberg AFB and 4.7 kilometers (2.9 miles) from SLC-3W. Wall Beach is just north of the Park and the mouth of the Santa Ynez.

**Group E.** Jalama Beach County Park is located near the southernmost tip of the base, some 14.5 kilometers (9 miles) from the V-33 area site. In addition, sandy beach areas extending approximately 1.6 kilometers (1 mile) northwest of Jalama Beach County Park are open to the public.

### 3.7 NOISE

Characteristics of sound include amplitude, frequency, and duration. In environmental noise assessments, sound pressure (energy) is the parameter usually measured; it is denoted in terms of decibels (dB). Due to the extremely large range of measurable sound pressures, the dB is expressed in a logarithmic scale. This permits calculations that allow for large variations in sound pressure, while maintaining a manageable scale of measurement.

As noted above, the dB is the accepted standard unit of measure for sound pressure level (SPL). Since there is no absolute lower limit of sound, dBs are calculated using a reference acoustic pressure. The calculation follows this formula:

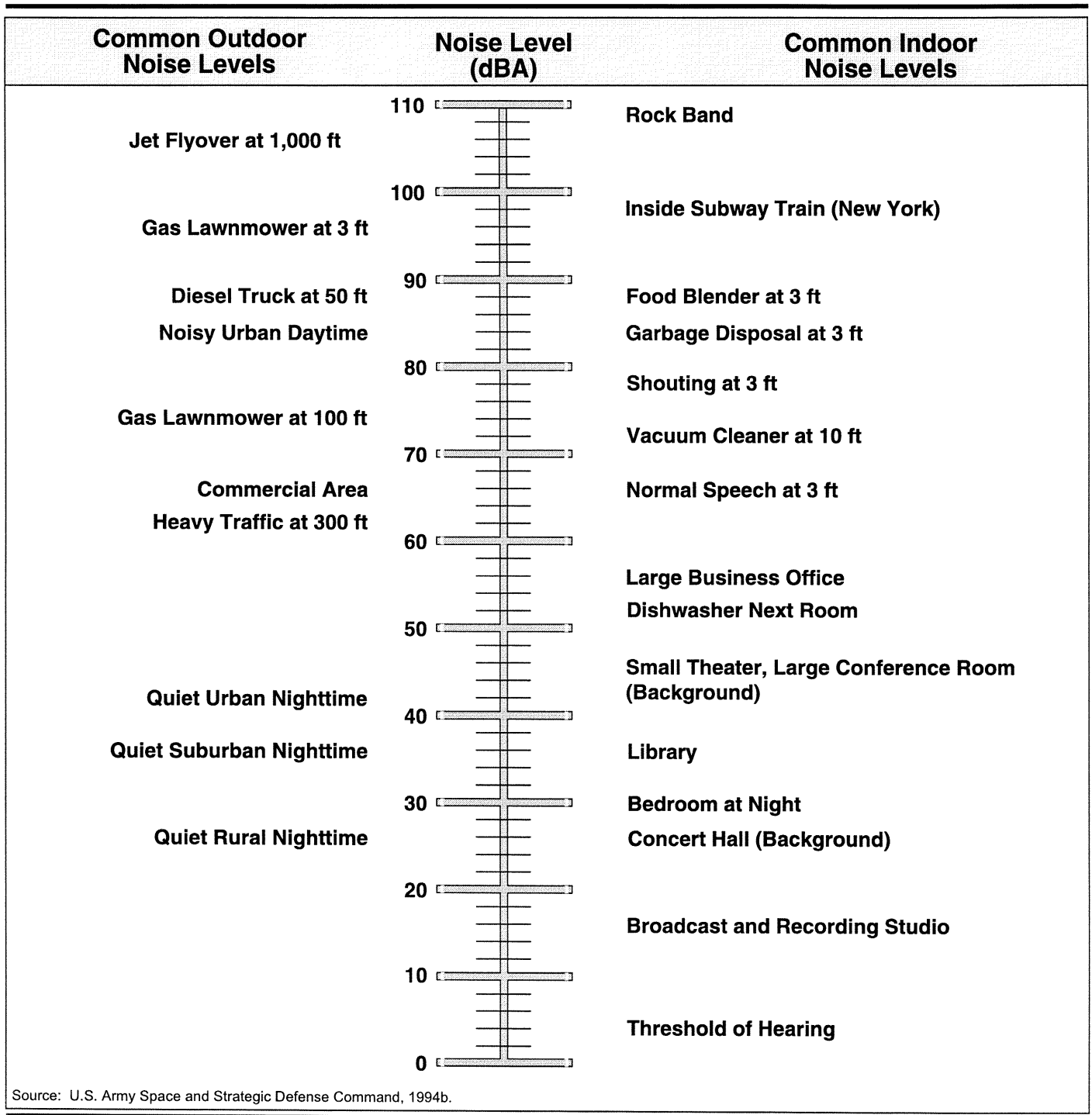
$$\text{dB} = 10^2 \log_{10}(p^2 / p_{\text{ref}}^2),$$

where dB is the measured SPL;  $p$  is the measured acoustic pressure; and  $p_{\text{ref}}$  is the threshold of human hearing ( $2 \times 10^{-5} \text{N/m}^2$ ). This results in a measure of 0 dB at the threshold of human hearing.

The human ear is not equally sensitive to all frequencies throughout the spectrum. Sound levels adjusted for frequency-dependent amplitude (as established by the American National Standards Institute) are called “weighted” sound levels (American National Standard Institute, 1983). Weighted measurements emphasizing frequencies within human sensitivity are called A-weighted (dBA); typical A-weighted sound levels are displayed in figure 3-4. When high-intensity impulsive sound is evaluated to determine its effects on human populations, C-weighted sound levels are used; this applies weighting to low-frequency effects. These effects include windows rattling and vibrations that influence people’s perceptions of a sound.

Noise is usually defined as undesirable sound, because it interferes with verbal communication and hearing, can cause hearing loss, or is otherwise annoying. Since noise levels vary with time, several descriptors have been developed comparing these variations over different time periods. The most commonly used descriptor in environmental reports is the day-night average sound level ( $L_{\text{dn}}$ ). The  $L_{\text{dn}}$  is the weighted average sound level for a 24-hour period (with a 10 dB “penalty factor” for all sound from 10:00 p.m. until 7:00 a.m.), used by the U.S. Air Force to determine community noise impacts over extended periods.

The State of California has implemented a third measurement, the community noise equivalent level (CNEL). Similar to the  $L_{\text{dn}}$ , the CNEL adds a 5 dB “penalty” to all sound between 6:00 to 10:00 p.m.. In areas with a normal level of evening activity, the CNEL is approximately 1 dB higher than the  $L_{\text{dn}}$ . The California Division of Aeronautics has established a CNEL of 65 dB as an acceptable level of noise to a reasonable person.



**Comparative  
Sound Levels**

**Figure 3-4**

The major shortcoming of both the  $L_{dn}$  and the CNEL is that the 24-hour averaging tends to obscure high-noise, short-term events (such as missile launches). In these cases, the maximum sound level ( $L_{max}$ ) is required; used predominately to gauge high noises of short duration, it measures the greatest level occurring during a single noise event.

A consideration implemented by U.S. Army policy is to equate different kinds of noise on the basis of equal annoyance. This follows the recommendation of the National Research Council (1981) by adoption of Army Regulation (AR) 200-1, which defines three land use zones in terms of annual average C-weighted  $L_{dn}$  (table 3-5). These three zones are used to determine the amount of the populace likely to be annoyed by a particular noise level.

**Table 3–5: Definition of Noise Land Use Zones**

Noise Level	Compatibility with Noise Sensitive Land Use	Percent of Population Highly Annoyed	C-weighted $L_{dn}$
I	Acceptable	Less than 15%	Less than 62 dB
II	Normally Unacceptable	15%-39%	62-70 dB
III	Unacceptable	More than 39%	More than 70 dB

Source: U.S. Department of the Army, 1990.

## Region of Influence

Under the Code of Federal Regulations (CFR), Title 29, Part 1910.95, employers are required to monitor employees whose exposure to hazardous noise could equal or exceed an 8-hour time-weighted average of 85 dBA.

Therefore, the ROI for noise analysis at Vandenberg AFB is defined as the area within the  $L_{max}$  85 dB contours generated by proposed project activities. This contour ranges from an area up to approximately 1.67 kilometers (1.04 miles) from any Lance target missile launch site to an area up to approximately 27.9 kilometers (17.4 miles) from any PAAT missile launch site. For the larger Hera-type missile launches, this would be an area up to approximately 38.1 kilometers (23.7 miles) from the SLC-5 or V-33 launch sites.

## North Vandenberg Air Force Base

A 1984-1985 noise monitoring of Vandenberg and surrounding areas showed average ambient noise levels, typical of residential and urban areas, of 48-67 dBA. Rural and isolated areas of Vandenberg, Lompoc Valley, and Northern Santa Barbara county would have average noise levels less than 45 dBA. Substantial sources of noise in Lompoc, the nearest urban community, include automotive traffic, rail activity, and aircraft noise (U.S. Department of the Air Force, 1991a). Vandenberg operations, which include various aircraft (bomber, fighter jets, transports) activities as well as occasional rocket launches, are a major noise source in the region (U.S. Department of the Air Force, 1996). Of current activities, rocket launches generate the higher level of sound. However, they are infrequently performed and their noise is of relatively short duration.

## South Vandenberg Air Force Base

South Vandenberg's noise environment is similar to that found in North Vandenberg.



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## 4.0 Environmental Consequences

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## 4.0 ENVIRONMENTAL CONSEQUENCES

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This section describes the potential environmental consequences of the proposed activities by comparing them with the potentially affected environmental components. Sections 4.1 through 4.7 provide discussions of the potential environmental consequences of these activities. The amount of detail presented in each section is proportional to the potential for impacts. Sections 4.8 through 4.15 provide discussions of the following with regard to the proposed target launches: environmental consequences of the no-action alternative; adverse environmental effects that cannot be avoided; conflicts with Federal, state, and local land use plans, policies, and controls for the area concerned; energy requirements and conservation potential; irreversible or irretrievable commitment of resources; relationship between short-term use of the human environment and the maintenance and enhancement of long-term productivity; natural or depletable resource requirements and conservation potential; Federal actions to address environmental justice in minority and low-income populations.

In order to assess the potential for and significance of environmental impacts from the proposed testing activities, a list of activities was developed (section 2) and the environmental setting described (section 3) with emphasis on any special environmental sensitivities. Program activities were then compared with the potentially affected environmental components to determine the possibility or extent of any impacts from proposed target launches.

As a means of defining the affected environment and determining the significance of program-related effects, written, personal, and telephone contact with applicable agencies was accomplished. Section 7.0 comprises a list of these agencies.

Defensive missile launches from Vandenberg AFB have been previously analyzed in the TMD Extended Test Range EIS (U.S. Army Space and Strategic Defense Command, 1995). The use of the Lance or other mobile target missiles would require no construction or facility modification. Hera and other rail-launched TBM targets may require minor construction activities or facility modifications, but these launchers would be installed on an existing concrete pad or within a previously graded or graveled area in which construction of a concrete pad could be required. Launches of small target missiles from mobile or rail launchers would result in a potential for impacts similar to or less than those discussed in the Extended Test Range EIS for airspace, geology and soils, infrastructure, socioeconomics, and water resources; those impacts were determined to be insubstantial. The results are summarized in the following paragraphs.

**Airspace.** The impact of TBM test flights, compared to Vandenberg AFB's annual average of 15 missile launches and 100 test flights, is considered insubstantial. All launches, intercepts, and debris impacts would take place in either existing restricted area or warning area airspace that would be cleared of non-participating aircraft. The launches would be short-term events, after which joint-use airspace would be released to other users; scheduling would obviate impacts.

**Geology and Soils.** Spill prevention, containment, and control measures would prevent accidental spill impacts. Modeling results indicated impact to soils from  $\text{Al}_2\text{O}_3$  or HCl (exhaust products) deposition would be of little consequence; TBM Target exhaust amounts would be less. The handling and disposal of burning solid propellant reaching the ground would be covered by applicable Vandenberg AFB SOPs. Soil impacts from debris recovery would be minimal.

**Infrastructure.** It was determined that the use of existing housing facilities and a limited increase in traffic volume and transient personnel would have no adverse impacts. Air, rail, and marine traffic would not be affected; SOPs would cover any minimal impacts.

**Socioeconomics.** It was determined that the limited use of local restaurants and motels would have a positive effect on the economy and that the use of such accommodations during tourist season would have a very limited effect.

**Water Resources.** Spill prevention, containment, and control measures would prevent accidental water impacts. Modeling results indicated little impact from  $\text{Al}_2\text{O}_3$  or HCl deposition from TMD launch activities; TBM target exhaust amounts would be less. In addition, SOPs would cover handling and disposal of burning solid propellant reaching the ground. Water requirements for the proposed action did not represent a significant increase in usage.

## 4.1 AIR QUALITY

### North Vandenberg Air Force Base

Air quality impacts would be similar for all launch groups.

Santa Barbara County is in nonattainment for both the Federal and state standards for ozone and the state standard for PM-10. Therefore, emissions of ozone precursors  $\text{NO}_2$  and VOCs are of great concern. This is true even though the county is in attainment for both the NAAQS and CAAQS levels of  $\text{NO}_2$ . Similarly, emissions of PM-10 and possible PM-10 precursors, such as  $\text{SO}_2$ , are also of concern. Santa Barbara County's 1994 Clean Air Plan specifically addresses the reduction in ozone levels in the county by means of reduction in amounts of VOC and  $\text{NO}_2$  emissions. Additionally, the SBCAPCD has undertaken a special study to determine sources of PM-10 emissions and methods of achieving state PM-10 levels. (Santa Barbara County Air Pollution Control District, 1994)

The proposed action addresses the use of various sites at Vandenberg AFB to launch target missiles such as the Lance or PAAT target missiles, as well as to launch Hera-type target missiles from an emplaced 50k rail launcher. As stated in section 2, only limited construction is anticipated at the projected launch sites.

While not yet defined in detail, launch and pre-launch support activities would likely result in low emissions of VOCs from such activities as the use of cleaning solvents, oil and lubricants, and paints or thinners. These activities, and their attendant equipment, may require permits and application of BACT standards. Some examples of equipment that may be needed and that would require permits are diesel-fired engines and generators, boilers, paint spray booths, and abrasive blasting equipment (U.S. Department of the Air

Force, 1991b). Portable power generators operated at less than 20 horsepower or run less than 400 hours per year do not require permits; however, they do require monitoring devices to track hourly operations (Chapman, 1996a). Where necessary, permits can be obtained in 3 months, although an 8- to 9-month time frame is more likely (Buettner, 1993; Goldman, 1993; Rohr, 1993; Van Mullem, 1993)

Launch preparation and support activities could potentially have an impact on air quality at Vandenberg AFB, and would likely require air quality permits and associated mandated offsets. All emissions would be regulated in accordance with the two MOAs between Vandenberg AFB and the SBCAPCD. By way of illustration, the MOAs presently address such permitted equipment as boilers, diesel storage tanks, JP-4 fuel tanks, and transfer of rocket propellant. Specifically, the required offsets for this equipment are more than met by the Emission Reduction Credit generated by Vandenberg AFB under the Emissions Offset and Banking MOA (Santa Barbara County Air Pollution Control District, 1984; Santa Barbara County Air Pollution Control District, 1992; Santa Barbara County Air Pollution Control District, 1993; Vandenberg Air Force Base, 1992).

Emissions from rocket and missile launches are not considered stationary sources by the SBCAPCD (Goldman, 1993). For example, all the support equipment for the planned activities at Vandenberg AFB was permitted, except for the emissions from the rockets (Goldman, 1993).

Some of these activities may require permits, the application of BACT, and/or offsets. Any VOCs from surface cleaning operations could be minimized by controlling the amount of solvent used during each wiping and placing all spent rags containing solvent in covered containers. (U.S. Department of the Air Force, 1991b)

All emissions would be regulated in accordance with the MOAs between Vandenberg AFB and the SBCAPCD; therefore, impacts to air quality would not be expected to be substantial.

### **South Vandenberg Air Force Base**

Air quality impacts would be similar for all launch groups. The effects to the air quality of South Vandenberg AFB would be similar to those of North Vandenberg AFB.

### **Determination of Non-applicability**

The review of the proposed action as required by the General Conformity Rule resulted in a finding of presumed conformity to the SIP. Total foreseeable direct and indirect emissions caused by the proposed action are both less than the mandated *de minimis* thresholds and less than 10 percent of the established SBCAPCD budget. The DNA for this project is provided as appendix C.

### **Cumulative Impacts**

Missile launches are short-term, discrete events, thus allowing time between launches for the emission products to be dispersed. Assuming sufficient time between exercises, cumulative impacts to air quality would not be substantial.

## 4.2 BIOLOGICAL RESOURCES

Correspondence with the NMFS, the USFWS, state regulators, and other appropriate agencies was conducted to obtain their review comments on the proposed action. Impacts that could potentially result from launch-related activities include debris impacts, launch noise, sonic booms, and missile emissions such as HCl and Al<sub>2</sub>O<sub>3</sub>.

In addition, at the request of NMFS, the first launch of each missile type will be monitored for potential noise or visual impacts, in close coordination with regulatory agencies, including USFWS, NMFS, and any applicable state agencies. Results of the first launch(es) will determine whether continuous monitoring will be necessary.

On site monitoring will be conducted for specific areas of concern as determined by Vandenberg AFB, the USFWS, and the NMFS and in accordance with the mitigation and monitoring set forth in the Programmatic Marine Mammal Take Authorization submitted by Vandenberg AFB.

### Debris

Normal launch activities are not expected to adversely affect plant species, nor will proposed activities be expected to result in debris over land. The intercept debris impact over the Pacific Ocean will have no impacts upon vegetation. Debris impacts from normal launch activities are not expected to impact terrestrial or aquatic wildlife species.

The probability of a spent missile landing on a cetacean or other marine mammal is remote. Previous analysis of impacts from debris fallout upon migrating gray whales, selected as a representative cetacean likely to be in areas of potential impact, has been conducted. Analysis suggests that at a distance of 10 kilometers (6 miles) from the shoreline, the chance of a whale being struck and killed by falling debris during peak migration densities would be 1 in 10,000 per launch (U.S. Department of the Air Force, 1996). Therefore, TBM launches occurring at times other than during peak migration would present a significantly lower risk to migrating whales.

### Noise

The two areas that may be most affected by elevated sound levels associated with the proposed project are the launch sites and, to a lesser extent, the flight paths. Noise modeling was based on the most conservative scenario. Sudden noises (such as aircraft overflights, sonic booms, and rocket launches) cause variable reactions in wildlife, frightening some avian and pinniped species, while causing little or no reaction in others. The "startle effect" associated with ignition and lift-off is considered only a momentary, negligible effect (U.S. Department of the Air Force, 1989a).

During their breeding season, all pinnipeds are sensitive to disturbance; in elephant seals, for instance, it could lead to disruption of the social structure and mother/pup separations. California sea lions have a strong fear of humans, stampeding into the water when distressed. Their continuous disturbance will cause abandonment of the rookery. The same can be said of South Vandenberg area Pacific harbor seals. On the other hand, harbor seals in the North Vandenberg area show an unusual indifference to humans,

though persistent agitation or a close approach will cause them to vacate beach areas as well. (Vandenberg Air Force Base, 1993)

This abandonment as a result of launch site proximity to listed species' breeding areas may itself produce indirect impacts. During the temporary absence of adults flushed from the area by noise, predation or exposure could result in harm to eggs of sensitive bird species and affect both avian and pinniped young. Trampling during disturbance could represent a further endangerment to juvenile pinnipeds, as well. Night launches will be avoided where possible; however, some missions may require night or early morning (predawn) launches in order to accomplish specific program objectives.

The NMFS has been consulted regarding potential impacts on pinnipeds and the possible need for mitigation monitoring. However, the intermittent launches associated with the proposed project are not expected to substantially impact wildlife since the actual duration and frequency of the effects are expected to be low. Activities are also not expected to result in temporary or permanent hearing threshold shifts for marine mammals since the launch noise would be periodic and not of sufficiently high intensity. The startle effect would be a temporary disruption of behavior or physiological activities. TBM launches would be of a magnitude and frequency similar or less than that occurring at current active launch sites. Moreover, the use of multiple launch sites and mobile launchers would provide opportunities to reduce the likelihood of adverse effects during breeding and pupping seasons by allowing selection of other available sites, if necessary, thus avoiding certain species. In addition, personnel would be instructed to refrain from approaching marine mammal haulout areas and avian nesting and roosting sites.

## **Overflight**

Missile overflight could have an impact on marine mammals and birds. Noise impacts are the primary concern for many sensitive species; however, the altitude of the missiles once they approach the avian nesting or roosting, or marine mammal haulout sites would considerably lessen any harassment. Table 4-1 shows the approximate altitude of a representative target missile in relation to the distance from the launch site to the coastline. This negligible impact of overflight from missile launches would create no reduction in the stock of marine mammals or seabirds.

Helicopters could potentially be used to clear public areas prior to launches. Low-altitude helicopter flights are known to cause panicky reactions in various wildlife species; however, these flights would be intermittent, would involve gradual descents when necessary, and would return at an altitude that would avoid further startling wildlife.

## **Emissions**

Nominal launch activities during dry conditions could result in the deposition of very small amounts of  $\text{Al}_2\text{O}_3$  from missile exhaust. Most of the  $\text{Al}_2\text{O}_3$  would be suspended in air and dispersed over extremely large areas; the amount deposited in surface waters would have little effect. Under natural conditions, the chemical is not a source of toxic aluminum; the EPA has determined that nonfibrous  $\text{Al}_2\text{O}_3$ , as found in solid rocket motor exhaust, is nontoxic (National Aeronautics and Space Administration, 1990).

**Table 4–1: Approximate Elevation of Representative Target Missile in Relation to Coastal/Haulout Areas**

Launch Sites	Distance from Beach in Meters (Feet)	Approximate Altitude of Target in Meters (Feet)
<i>North Vandenberg</i>		
<b>Group A</b>		
LF-06	295.6 (970)	406.9 (1,335.1)
LF-07	487.7 (1,600)	671.2 (2,202.2)
LF-09	125 (410)	172 (564.3)
LF-25	664.5 (2,180)	914.6 (3,000.6)
LF-26	271.3 (890)	373.4 (1,225)
<i>Group B</i>		
LF-21	1,463 (4,800)	2,013.7 (6,606.7)
LF-22	1,450.8 (4,760)	1,996.9 (6,551.6)
LF-23	1,249.7 (4,100)	1,720 (5,643.2)
LF-24	731.5 (2,400)	1,006.9 (3,303.4)
<i>Group C</i>		
Rail Garrison	3,474.7 (11,400)	4,782.6 (15,691)
Test Pad-01	2,743.2 (9,000)	3,775.7 (12,387.6)
ABRES A-1, -2, -3	2,438.4 (8,000)	3,356.2 (11,011.2)
576-E	573 (1,880)	788.7 (2,587.6)
<i>South Vandenberg</i>		
<i>Group D</i>		
SLC-3W	2,926.1 (9,600)	4,027.4 (13,213.4)
	2,529.8 (8,300)	3,482.1 (11,424.1)
SLC-5	1,706.9 (5,600)	2,349.3 (7,707.8)
<i>Group E</i>		
V-33	490.7 (1,610)	675.4 (2,216)

Source: Vandenberg Air Force Base, 1996b.

Note: Given the launch angle ( $\alpha$ ) and distance from launch site to shore ( $\delta$ ), then shoreline target altitude is tangent  $\alpha$  multiplied by  $\delta$ . Not corrected for launch sites elevated above sea level.

Rain within 2 hours of launch could cause HCl to be deposited in small quantities. This chemical, emitted during solid propellant missile launches for very large flight vehicles (such as the space shuttle), is known to injure plant leaves and affect wildlife. However, results of a February 1993 USASSDC environmental monitoring program following a Strategic Target System launch indicated little effect upon vegetation or wildlife due to the resulting low-level, short-term HCl emissions. The program included marine surveys of representative birds and mammals for both prelaunch and postlaunch conditions,

concluding that any impacts resulting from the booster launch would be negligible. As the amount of HCl produced by the largest proposed TBM booster is much smaller than that produced by the boosters monitored by U.S. Army Space and Strategic Defense Command (USASSDC) in February 1993, the potential impact on vegetation and wildlife from the proposed launches is also expected to be slight. As regards surface waters, the HCl would cause a change in pH of only short duration; any alteration of the water's pH would be almost imperceptible. (U.S. Army Space and Strategic Defense Command, 1993)

A launch mishap of the liquid propellant Lance missile or similar liquid propellant missiles, could result in the unlikely, but possible, limited emission of nitric acid through release of IRFNA. The reaction of the acid with water would initially cause violent spattering, an increase in water temperature, and substantial lowering of the pH value in the local area. However, the low levels of the emission and the natural buffering capacity of water, particularly seawater combined with the strong ocean current, would neutralize the reaction in a relatively short period of time.

Combustion products generated by Lance would dissipate quickly based on their relatively small amounts, prevailing winds, and rapid decrease in ambient air temperature from ground level to their respective altitudes (Cortez III Environmental, no date). The additional distance from launch site ESQD perimeters to sensitive aquatic habitats and associated sensitive species and the limited emissions of exhaust products will minimize any potential impacts. Recent programs at Vandenberg AFB indicate that the only hazardous substances of sufficient quantity to warrant analysis at the range are UDMH and IRFNA; the solid propellants of such launch vehicles as the Terrier, Orion, and Black Brant would not affect a widespread area in an accident scenario (U.S. Department of the Air Force, 1996).

### **Early Flight Termination**

Fire from a launch mishap could impact any plant species that may be present near the launch sites; however, the use of existing sites would allow launching in areas where much of the vegetation has previously been removed. In addition, Vandenberg AFB has a wildland fuels management plan, prepared by the U.S. Forest Service, containing measures to help prevent large wildfires (such as prescribed burning activities which lower the age class of area vegetation). Moreover, emergency fire-fighting personnel are on stand-by status for all launch activities as a protective measure.

Fire from an early flight termination could impact wildlife near the launch site. The probability of an event occurring in proximity to an endangered or threatened species is low. Again, emergency fire-fighting personnel are on stand-by status for all launch activities as a protective measure.

Early flight termination could result in widely scattered debris, but the probability of this debris hitting a threatened or endangered species or other wildlife is remote.

### **North Vandenberg Air Force Base**

**Groups A and B.** The California brown pelican, known to roost in the Point Sal area, could be impacted by launches from Group A, as could the Pacific harbor seal, California least



tern, western snowy plover, migrant sea otters, and California red-legged frog. Species which could be impacted by launches from Group B include nesting western snowy plovers and California least terns, roosting California brown pelicans, the tidewater goby, the California red-legged frog, and pinnipeds in the nearby haulout area. Migrant sea otters may also be affected (Vandenberg Air Force Base, 1997). Scattered colonies of surf thistle are known in the area, but the probability of a launch mishap actually occurring in proximity to an endangered or threatened plant species is remote.

For mammal and avian species, impacts would be limited to startle or flushing reactions to the launch noise. The brief duration of the startle effect would cause, at most, a momentary impact, which is not believed to adversely affect their long-term well-being, reproduction rates, or survival. For amphibious or aquatic species, impacts could result from the exhaust products of launch activities. The dissipation of these combustion products and the distance to the water sources should obviate the severity of any impacts to species associated with those water bodies.

**Group C.** Species that could be potentially impacted by launches from Group C sites include nesting western snowy plovers and California least terns, as well as southwestern willow flycatchers. The proximity of the ABRES A sites to San Antonio Creek, habitat for the unarmored threespine stickleback, tidewater goby, and California red-legged frog (also found in Mod III Lake) could result in limited impacts to those species from noise and exhaust products. However, the creek is sheltered from most launch operations by its distance from them, as well as a 61-meter (200-foot) drop in elevation (U.S. Department of the Air Force, 1989a). Roosting California brown pelicans and Southern sea otters (a Federal threatened species) are found around Purisima Point and could be impacted by activities at 576-E. This site is also located near a haulout area for pinnipeds. Launches from site 576-E will be restricted to the period between 1 October and 31 December to avoid breeding seasons for listed species. The mountain plover, sighted wintering on Vandenberg AFB land only within the airfield region, is outside the 85-dB noise contour and should not be affected.

Though launching from sites near Purisima Point could impact species such as the sea otter and California sea lion, it is not as likely as the effects (predominately, a temporary abandonment of haulout areas) upon the protected harbor seal. Within the ROI, scattered colonies of surf thistle (north and south of the mouth of the San Antonio) and a single colony of Lompoc yerba santa are known to exist. Again, the probability of a launch mishap occurring in proximity to an endangered or threatened plant species is remote, particularly in the case of a limited population such as that of the Lompoc yerba santa.

### **South Vandenberg Air Force Base**

Species which could be impacted by launches from South Vandenberg AFB include nesting seabirds, California brown pelicans, peregrine falcons, and Pacific harbor seals. The impacts would be limited to startle or flushing reactions to the launch noise, which is not believed to adversely affect their long-term well-being, reproduction rates, or survival.

The tidewater goby, unarmored threespine stickleback, and the California red-legged frog could be impacted by the launch noise or from the limited release of exhaust products, but impacts would be limited by their relative distance from the launch sites. Launches from

Groups D and E will avoid overflights of Points Arguello and Pedernales during the nesting season, if possible.

**Group D.** Personnel would be instructed to avoid avian nesting and roosting areas near SLC-3W. The unarmored threespine stickleback, tidewater goby, and California red-legged frog, found near SLC-5 in the Cañada Honda Creek, could be impacted; however, impacts would be negligible due to the limited, brief noise from a launch event, the limited release of exhaust products, and launch site distance. The southwestern willow flycatcher, steelhead trout, and tidewater goby found within the Santa Ynez river area, are at sufficient distance from the Group D launch sites to avoid impacts. Launch noise could have a limited startle-reaction effect on western snowy plovers, California least terns, and peregrine falcons (Vandenberg, 1997). One small, isolated colony of beach layia is located within the Group D area, and the surf thistle can also be found there. Again, the probability of a launch mishap occurring in proximity to any sensitive plant species is remote, and for the beach layia, practically nonexistent.

**Group E.** Potential impacts on pinniped haulout areas near the V-33 area would be identical to those mentioned under the Group C site(s) heading. California brown pelicans roosting near Point Arguello and V-33 could also be affected. Launch noise could have a limited effect on western snowy plovers, California least terns, peregrine falcons, southwestern willow flycatchers, and sea otters (Vandenberg Air Force Base, 1997). The noise impact would be of minimal duration. Personnel would be instructed to avoid avian nesting and roosting areas and marine mammal haulout areas (which include Point Arguello and Rocky Point, also known locations for the surf thistle).

The probability of early flight termination debris impacting an endangered or threatened species is low. Debris recovery activities could affect such species; however, with appropriate measures the impacts would be minimized.

### **Cumulative Impacts**

Target missile launches combined with potential commercial launches would contribute to increased launch frequency on Vandenberg AFB and could result in cumulative impacts to wildlife.

The NMFS has been consulted regarding potential impacts on pinnipeds and the need for monitoring (Vandenberg Air Force Base, 1993). All reasonable efforts would be made in scheduling tests to avoid sensitive areas during the pupping seasons of marine mammals, the least tern and snowy plover nesting seasons, and the migration period of the California gray whale; such actions are standard procedure for other types of offshore uses such as oil and gas exploration (County of Santa Barbara, Planning and Development, 1994). The use of mobile launchers would allow greater flexibility in selecting launch locations and reducing the frequency of launches in any particular locale, thus lessening the probability of impacting on-base sensitive species. The rail launcher site, if selected, would be fixed.

On site monitoring will be conducted for specific areas of concern as determined by Vandenberg AFB, the USFWS, and the NMFS and in accordance with the mitigation and monitoring set forth in the Programmatic Marine Mammal Take Authorization submitted by Vandenberg AFB.

## 4.3 CULTURAL RESOURCES

This section discusses the effects of the proposed action on Vandenberg AFB cultural resources. Cultural resource impacts would be similar for all launch site groups. Cultural, archaeological, and paleontological resources are limited, nonrenewable resources whose potential for scientific research (or value as a traditional resource) may be easily diminished by actions impacting their integrity. The disturbance of an archaeological site removes cultural material from its original context and, therefore, results in the loss of information about the site.

Since all construction would take place on existing concrete pads or within previously graded or graveled areas, the proposed construction activities will have no effect on historic properties.

Only in the unlikely event of flight termination over land (necessitating debris recovery within the ROI) would the possibility for impacts to cultural resources from off-road vehicle activity exist. Even then, all areas affected by ground impacts of flight hardware would be cleared of all recoverable debris in strict accordance with current Vandenberg AFB policy.

Other potential effects could result from this debris striking the ground where surface or subsurface archaeological deposits are located. The probability of this occurring, however, is considered extremely remote. Debris falling offshore would pose no threat to Vandenberg AFB's cultural resources.

Lastly, potentially adverse effects to area historic and prehistoric resources could also occur as a result of pothunting, the unauthorized collection of artifacts by flight preparation personnel during outdoor recreation activities. These personnel would receive a brief orientation involving a definition of cultural resources and protective Federal regulations. Unexpected discovery of cultural resources during the course of TBM testing would be reported to the Vandenberg AFB Environmental Division.

### **Southern Vandenberg AFB**

Some South Vandenberg facilities are located where known archaeological or Native American traditional cultural properties exist; such areas are considered by Environmental Management personnel to be archaeologically sensitive (U.S. Department of the Air Force, 1992). Again, the lack of ground-disturbing activities, the improbability of launch or flight termination, and the doubtful possibility of random debris striking an archaeologically sensitive resource will offset the chance for negative consequences. Previous surveys of the Boathouse area indicated that most archaeological resources in that area are located on or near its western edges and thus were sufficiently removed from the V-33 site to negate the potential of an adverse effect upon historic properties (U.S. Department of the Air Force, 1991b).

### **Cumulative Impacts**

No cumulative impacts to cultural resources are expected as a result of the proposed action.

## 4.4 HAZARDOUS MATERIALS AND WASTE

No conditions associated with target missile launches at Vandenberg AFB have been identified which would substantially alter the intensity of hazardous materials usage.

### Hazardous Materials

Classes of hazardous materials proposed for use in TBM target missile prelaunch and launch operations are similar to hazardous materials currently in use at Vandenberg AFB. Solvents and other materials used in preflight preparations, solid propellants, and other explosives are widely used in current systems, and liquid propellants (hypergolics) are used in some flight systems. Proposed uses of these materials would represent only a small increase in Vandenberg's total usage of hazardous materials, with no notable changes in the types of materials handled and stored. Actual procurement, handling, and use of hazardous materials would be performed by the target's program; however, Vandenberg AFB would oversee operations to ensure they are conducted in accordance with established procedures and permits.

Use of hypergolics such as UDMH, kerosene-based fuel, initiator fuel (triethylamine/dimethylanilines), and IRFNA must comply with 30 SW Instruction 91-106, *Toxic Hazard Assessment* (Vandenberg AFB, 1993). When used in quantities of 453.6 kilograms (1,000 pounds) or more, UDMH is covered by Process Safety Management (PSM) standards such as 29 CFR 1910.119, Air Force Occupational Safety and Health 91-119, and 30 SW Plan 91-119. Nitric acid (94.5 percent by weight or greater) is also covered under PSM when used in quantities of 226.8 kilograms (500 pounds) or greater.

The maximum UDMH present at any given time for TBM target launches would be 850 kilograms (1,873.8 pounds). The maximum kerosene-based fuel, initiator fuel, and IRFNA present at any given time for TBM target launches would be 2,475 kilograms (5,445 pounds), 90 kilograms (198 pounds), and 8,760 kilograms (19,272 pounds).

All hazardous materials, specifically fuels and oxidizers, will be assessed by 30 SW/SE for possible toxic hazards from a launch mishap or a spill on the launch pad (Cortopassi, 1996). A Liquid Propellant Accident Response Plan currently in use minimizes impacts in the event of an accidental spill. Monitoring is performed during transfer operations to ensure that no propellant releases have occurred, and all propellant transfer equipment is leak-checked prior to use. Existing hazardous materials storage and handling capabilities at Vandenberg are adequate to ensure that all materials are handled safely and in accordance with applicable regulatory procedures. It is not anticipated that there would be any emissions capable of producing adverse impacts associated with the use of hazardous materials. Launch emissions would be limited to exhaust products, the effects of which are fully addressed in section 4.1.

Since proposed hazardous materials and their impacts are similar to those used currently, their transportation can be accomplished via existing base infrastructure, without necessitating revised procedures or unusual requirements. Hypergolics are routinely transported to Vandenberg by dedicated tanker-truck shipments. No handling of hypergolics would occur at the launch site. Moreover, no unusual handling requirements

would be associated with their use. Propellants for additional liquid-fuel missiles would be transported to Vandenberg AFB in DOT-certified transport/storage containers and transferred from these containers into the missile. The kerosene-based fuel and IRFNA would be transferred into the missile a couple of weeks before launch. The initiator would be transferred into the missile (via a remote pressure transfer system) no more than a couple of hours before launch.

Should emergency actions dictate the refueling of a target missile, propellants would be unloaded on a non-permeable surface and containerized within approved receptacles; any waste spills would also be collected and containerized.

### **Hazardous Waste**

Proposed prelaunch operations could generate limited quantities of hazardous waste, such as unused or contaminated cleaning solvents, unused lubricants, or hydraulic fluids. Similar waste types are currently generated at Vandenberg AFB during existing operations, and the proposed action would not create a substantial increase in total waste quantities produced, handled, and disposed of by the existing hazardous waste management system. Vandenberg procedures and infrastructure are sufficient to accommodate all hazardous waste produced by the proposed test operations.

### **Cumulative Impacts**

Vandenberg's current hazardous material and hazardous waste management systems are designed to prevent releases of hazardous materials to the environment, where their presence could create a contamination issue. Consequently, management emphasizes the need to use or dispose of all materials in a timely and acceptable manner, in accordance with applicable regulatory and public policy requirements. Proper management of hazardous materials and waste would preclude any impact due to their accumulation in the environment as a result of routine usage. In the event of an unplanned release, the facility has implemented an emergency response procedure, based upon the *1996 North American Emergency Response Guidebook*, to aid in the evaluation and cleanup of any hazardous materials released (Chapman, 1996b).

As compared to current levels, hazardous waste quantities produced by proposed activities would not represent a substantial increase in either totals or types of hazardous materials or waste. Additional on-base activities could further augment these totals, but the current system is capable of meeting any foreseeable accrual efficiently and without incident.

## **4.5 HEALTH AND SAFETY**

Section 4.1.1.7 of the TMD Extended Test Range EIS provides an analysis of health and safety issues which are not site-specific, comparing such items as hazardous emission products and explosive and transportation (air, rail, road) safety with current levels and practices. All were found to present a negligible impact. Furthermore, no conditions associated with target missile launches at Vandenberg AFB have been identified which would alter the intensity of any of these impacts.

At Vandenberg, all target missile prelaunch operations involving explosives would require implementation of a written procedure which has been approved by 30 SW/SE and must be conducted under the supervision of an approved safety monitor in tandem with explosive-certified personnel. All electrical equipment is rated for use in hazardous environments.

All storage and handling of explosives would be required to take place in facilities designed to handle explosives and which have been sited in accordance with the requirements of Air Force Manual 91-201 (dated 1 December 1996), *Explosive Safety Standards* (U.S. Department of the Air Force, 1990c; Chapman, 1996b). To ensure safety in the event of explosion, this manual specifies the required ESQDs for each facility, based upon that facility's maximum quantity of allowable explosive material. This serves to prevent propagation of explosions to nearby facilities wherein other explosives are stored. The ESQD for the Hera target missile is 381 meters (1,250 feet) around facilities wherein Hera components were stored or handled. Since no large quantities of fuels are proposed in conjunction with target missile activities, explosive potential from fuel storage is expected to be negligible. The proposed launch sites are covered by existing approved explosive site plans.;

Additionally, Vandenberg AFB maintains an active unit for the disposition of explosive ordnance, whose assigned personnel have been intensively training in the handling, defusing, and disposal of explosive devices. The Explosive Ordnance Disposal Flight group (30 CES/CED) is overseen by the 30<sup>th</sup> Civil Engineer Squadron (Chapman, 1996b). Available to respond to any accidents or other mishaps involving explosives, this unit can also assist during any debris recovery undertaken. An accident response team and ordnance personnel will control liquid propellants and ordnance involved during launch of target missiles using liquid propellants.

Explosive devices and materials proposed for use with TBM operations, as well as the operations conducted to prepare and launch the target systems, are very similar to those currently in use on base. Base operations (prelaunch preparation, installation, and testing) would not require any unusual safety procedures. Implementation of standard safety procedures and reviews, as well as similarity to current operations, will aid in reducing the potential for explosive hazards.

### **Launch Hazard Areas**

During launch, there is a potential for missile malfunction, resulting in explosion, fire, and debris impact in the launch site vicinity. Successful launches involve only small potential hazards, mainly for personnel in the immediate area; these personnel are protected or evacuated from the area and potential hazards are thus controlled. On the other hand, a launch pad or near-launch anomaly or termination requires stricter controls.

To provide protection for mission-essential personnel, all launch activities would require the establishment of an LHA for each test flight mission. The LHA provides a designated area from which personnel are cleared based upon potential hazards from any missile debris that may result from launch or near-launch difficulties.

The sizes of the planning LHAs for potential launch sites are determined based upon a composite of potential mission profiles and vehicle performance characteristics. However, for each mission, a mission-specific LHA would be established based upon the actual flight profile, launch site, and system performance. (Richardson, 1997)

Other factors include the size and flight characteristics of the missile and the available reaction time between recognition of a flight malfunction and the decision to terminate flight. The size of an LHA is determined by simulating the missile's capability to travel off course in any direction (360 degrees) about the launch point for a specified period of time. Though typically five seconds, the time period may be modified as mandated by local range procedures, capabilities, and mission requirements. Analysis assumes that at the end of this period, missile flight is terminated by an FTS and the resultant debris falls to the ground or ocean. The outer perimeter within which the debris would fall (in any direction) defines the boundaries of the LHA.

Provisions for Vandenberg AFB LHAs are established in EWR 127-1, and each proposed mission-specific LHA is approved by 30 SW/SE based upon mission-specific parameters and the capabilities of on-base range instrumentation (Richardson, 1997). The size of a mission-specific LHA can be considerably smaller than the planning LHA, but would in all cases be fully contained within the planning LHA, which represents the area bounding all potential hazardous debris impact points.

The LHA does not encompass all areas wherein secondary effects, such as fire risk, may result during launch. However, the potential fire hazards associated with proposed TBM operations are considerably less than those associated with other launch vehicles due to the smaller size of the launch systems, the reduced equipment need, and the use of existing launch sites where vegetation and other flammables have already been removed. In addition, adherence to the aforementioned Vandenberg wildland fuels management plan would aid in preventing large wildfires. As a result, fire is considered to be a remote probability event. Emergency fire-fighting personnel are on stand-by status for all launch activities.

The LHAs for some proposed launch sites may extend beyond the Vandenberg AFB boundaries; however, current and past landowner agreements exist which permit control of these areas during launch activities. Implementation of LHA procedures allows management of the population which can be affected by a launch, and minimizes hazards associated with unplanned flight termination.

### **Target Missiles**

In order to ensure immediate response and rapid control in the event of an accident, Vandenberg AFB would maintain a stand-by emergency response team (consisting of fire fighting, safety, medical and bioenvironmental engineering personnel) near each site during all launch activities. This team would have the ability to utilize additional Vandenberg AFB personnel and resources as necessary. In addition, due to the base's ongoing ballistic missile launch activities, agreements have been developed with local county agencies to provide accident response resources as needed, and to establish the authority for a coordinated accident response.

Successful or unsuccessful intercepts would each result in the impact of debris in two separate areas (one for the target vehicle and one for the defensive missile), referred to as impact zones. For both the successful and unsuccessful intercept cases, it is possible to determine the extent and location of the two associated impact zones prior to launch based upon mission parameters. For a test mission to receive approval from 30 SW/SE, impact zones would have to be limited to the broad ocean area of the Western Range. (Cortopassi, 1996).

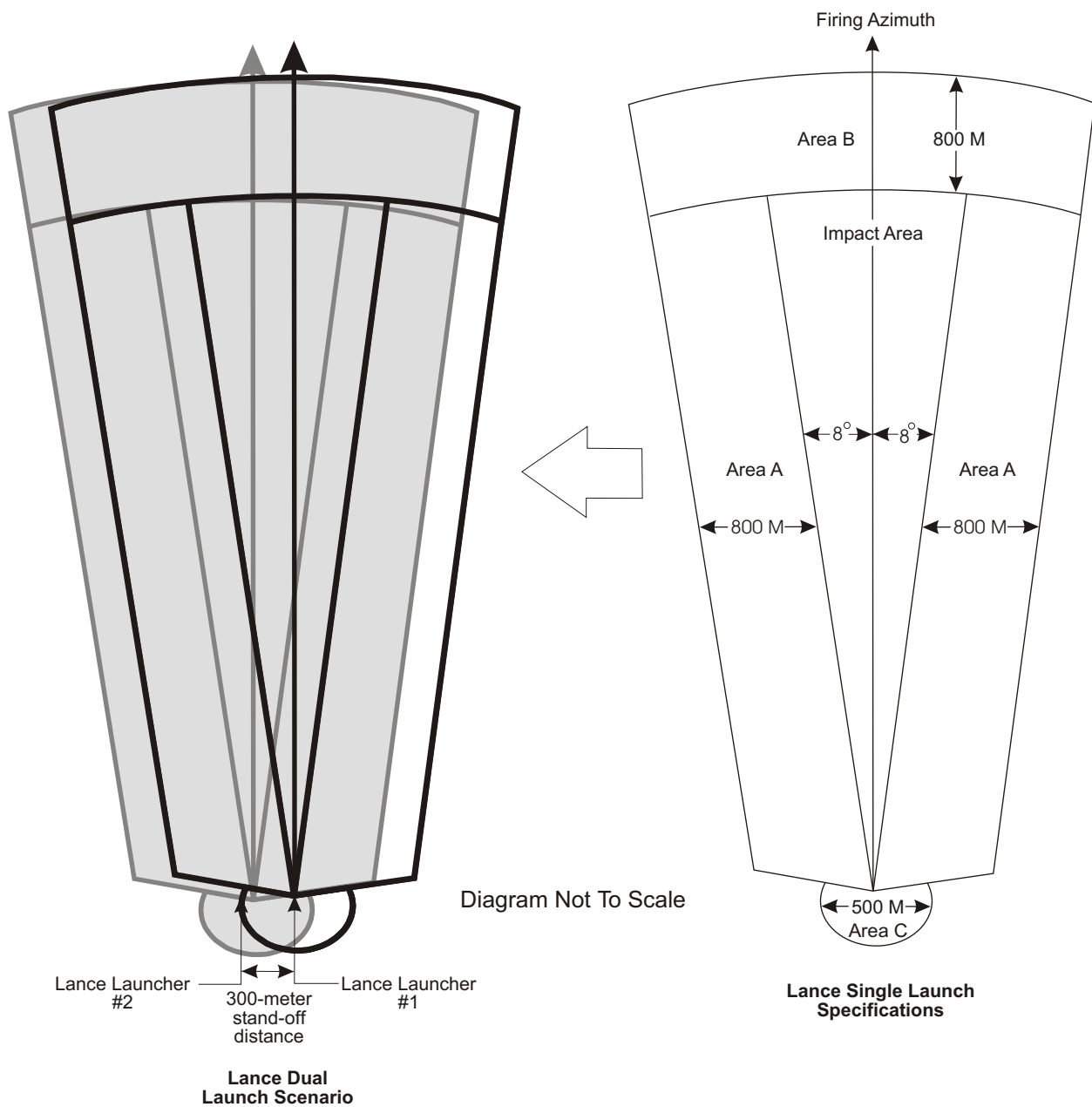
For test operations, the following designated areas would be controlled and determined to be evacuated of personnel: the LHA, the impact areas of both the target vehicle and intercept vehicle (in the event of a failed intercept), and, after appropriate analysis, any oil platforms that are determined to be exposed to unacceptable levels of risk. However, due to their location within the open water test range and the low probability of debris impacting at any individual location within the impact zones, hazard potential is low.

Reliability of the proposed missiles is considered to be quite good in terms of achieving successful launches, since their use at Vandenberg would not present any special challenges to the system reliability, despite high on-base airborne salinity levels which tend toward corrosion. Exposure of the flight systems to the ambient environment would be minimal, and the systems would be well able to resist the effects of exposure to the elements for such short time periods.

**Lance.** The standard LHA for Lance is a 500-meter (1,640-foot) radius around the launch site. In addition, acoustic levels behind the Lance are considered hazardous to personnel for this same radius; personnel would be informed of hazards and furnished proper hearing protection (Cortez III Environmental, no date). The LHA, or surface danger zone, can be seen in figure 4-1, and includes adequate area to contain the impact of errant missiles and associated debris. Where applicable, surface danger zones should encompass the maximum vehicle impact dispersion caused by fin failure, as well. When terrain conditions preclude the extension of the firing cable from 90 to 100 meters (295 to 328 feet), personnel actually engaged in firing the missile may be positioned within 80 meters (262.5 feet) from the launcher. Such personnel must be protected by a hardened shelter (such as a bunker or blockhouse) which both shields their bodies and reduces acoustic hazards. (Systems Applications Management Office, 1995) The 30 SW/SE will review all support personnel locations to ensure that risk levels are within acceptable limits. Essential personnel must also have proper breathing apparatus, in the event of on-pad or early flight termination.

The liquids utilized as a propellant for the Lance missile, UDMH (fuel) and IRFNA (oxidizer), present safety concerns for mission-essential personnel and those engaged in fuel transfer. UDMH-related health hazards include respiratory irritation and impairment of the blood, kidneys, and liver. The acid gases from IRFNA may cause severe burns from either direct contact or inhalation. Liquids utilized for other similar missiles are starter fuels, IRFNA, and kerosene-based fuel. Kerosene-based fuel is harmful by inhalation, ingestion, or by contact with eyes and skin. Inhalation of vapors may cause headache, nausea, weakness, and unconsciousness, and vapors may be aspirated into the lungs if swallowed. The chemical composition of kerosene-based fuel includes 5 to 20 percent benzene, a class 2A carcinogen per the National Toxicology Program, International Agency for Cancer





Source: White Sands Missile Range , 1996.

## EXPLANATION

Area A = Lateral Danger Area  
 Area B = Maximum Secondary Danger Area  
 Area C = Launcher Danger Area

## Surface Danger Zones

**Figure 4-1**

Research, and the Occupational Safety and Health Administration that is suspected to be a human carcinogen. Personnel involved in handling the kerosene-based fuel wear Level "B" clothing with supplied breathing air, splash protection, and radios. The kerosene-based fuel is toxic yet not as volatile as UDMH. Though stable, the fuel and its vapors are flammable, and oxygen and strong oxidizing agents should be avoided. Rapid combustion of air/fuel vapors or confined quantities of fuel can be explosive.

Initiator fuel is moderately toxic by ingestion, skin contact, and inhalation; is a severe skin and eye irritant; and can cause kidney and liver damage. Personnel involved in handling the initiator fuel will wear fully encapsulated (Level "A") suits with supplied or independent air, escape air cylinder, and radios. Like UDMH, the initiator is explosive if vapors are exposed to heat or flame, or when heated under confinement. It will react with acids, oxidizing agents, and heat or flame, spontaneously causing fire.

The use of refurbished and certified ready-to-fire missiles would limit handling of the missile and its fuels. Briefing of personnel regarding health hazards and allowing time after impact for dissipation or degradation of residual fuels would offset potential hazards. (Cortez III Environmental, no date) Hazards to personnel are minimized by proof-testing all lifting hardware, annual inspections, personnel certification, and the use of personnel protective equipment. The launch control van is placed upwind to minimize propellant vapor exposure risk. A propellant operations support trailer provides storage and transport of hazardous material response equipment and propellant detection equipment. Monitoring is performed during transfer operations to ensure that no propellant releases have occurred, and all propellant transfer equipment is checked prior to use.

In the unlikely event that a Lance tankage sustains critical damage during handling, a propellant draining kit, composed of oxidizer and fuel draining kits, would allow safe draining of the propellant when in the field. A minimum three-member crew, outfitted with protective clothing and breathing apparatus, is required (LTV Aerospace and Defense Missiles Division, 1991).

As stated earlier, Lance does not employ an FTS; however, its system performance data will be evaluated by the Vandenberg Flight Analysis branch of 30 SW/SE prior to launching to determine whether or not an FTS is warranted (Garcia, 1997). If so, compliance with applicable EWR 127-1 requirements will be mandated (Cortopassi, 1996).

**HERMES.** The HERMES launch danger area extends 350 meters (1,148 feet) to either side of the launcher (that is, 700 meters [2,297 feet] across the rear of the launcher and 400 meters [1,312 feet] to the rear of the launcher). A noise hazard area extends an additional 500 meters (1,640 feet) past the debris hazard area. The noise hazard during launch, though substantial, is attenuated by designating off-limit zones to personnel; entry into said zones is either denied or allowed with adequate hearing protection for those personnel who must occupy these zones for mission support. (U.S. Department of the Army, 1991)

The HERMES could be fitted with an FTS designed to destroy the missile if abnormal functioning of the system is detected during launch or flight phases.

**PATRIOT.** The established PATRIOT LHA is an approximate 2,000-meter (6,562-foot) radius. This area would be cleared of all non-essential mission personnel prior to each launch (U.S. Army Space and Strategic Defense Command, 1995). Hearing protection must be worn by all personnel within 74.4 meters (244 feet) of the launchers. Most personnel would not be located within this range, save those that personally man the Engagement Control System; these workers must be adequately protected by hardened sheltering and noise attenuation.

The personnel radiation hazard keep-out area is approximately 170 meters (558 feet) to the front and sides of the radar face. Appropriate warning signs would be posted.

The PATRIOT missile is equipped with an onboard FTS; moreover, it has been extensively tested and operated at locations around the world. As a result, its associated launch activities are considered routine and conducted in accordance with long-established procedures which ensure worker protection. However, any FTS employed must still meet EWR 127-1 standards.

**Hera.** For solid-fuel targets such as Hera, previous missions (such as that outlined in the Hera Target Systems EA) have suggested a 7.2-kilometer (4.5-mile) LHA, which provides a sufficient area to encompass any mission-specific LHAs (U.S. Army Space and Strategic Defense Command, 1994a). For Vandenberg AFB purposes, the exact size of the Hera LHA will be determined per 30 SW/SE specifications, as previously mentioned. Hera utilized an ESQD around the launcher of 381 meters (1,250 feet) wherein all hazardous debris resulting from a termination prior to launch would be contained.

### **Cumulative Impacts**

The increased on-base use of hazardous materials and explosives, as well as other prelaunch activities associated with proposed operations, would represent a small increase in potential safety risk. Target launches associated with these operations would also increase the level of safety risk; however, this increase would be minimal. Existing safety standards would serve to keep the total impacts attributable to all Vandenberg AFB operations within standards acceptable to both workers and the public.

## **4.6 LAND USE**

The use of existing Vandenberg AFB facilities to launch target missiles would not alter the overall land use and management of the base. Similarly, since the proposed activities would only use existing or modified facilities on an military installation already utilized for launching missiles, no adverse direct or indirect visual impacts would occur.

Although no adverse impacts to on-base land use are anticipated and no mitigation measures are required for the base, there is a potential for cumulative adverse impacts on coastal access, recreation, and commercial and sport fishing industries. These potentially adverse impacts can be minimized considerably by restricting launches to weekdays only, with night launches and weekends as a possible alternative.

Similarly, potential adverse impacts on the commercial and sport fishing industry can be minimized by ensuring that the same advance notice given to private land owners and

affected Government agencies in on-land LHAs (outlined in section 2.2.1.2, p. 2-52 of the Draft Extended Test Range EIS) would be given to offshore users, particularly the California Sports Fishing Association and the various commercial fishing organizations and associations.

With sufficient advance notice of activation of offshore LHAs, fishing boats can schedule their trips to avoid the area. Also, efficient and timely coordination between the TBM targets program, the U.S. Air Force, and personnel on the patrol boats and helicopters responsible for clearance of offshore LHAs is critical. Minimizing launches during the prime commercial fishing season, from October through January, and avoiding launches on the weekends during the summer months (for benefit of the sportfishing industry) would also mitigate impacts.

### **North Vandenberg Air Force Base**

The Rail Garrison, Test Pad-01 sites or LF-23 and -24, would still remain under U.S. Air Force management and would continue to be sites used for missile research. Target missile launches are entirely consistent with the Vandenberg AFB mission and would not conflict with any land use plans, policies, or controls for the base, which is the headquarters of the U.S. Air Force's 14<sup>th</sup> Air Force and 30<sup>th</sup> Space Wing. Approximately 15 to 20 missiles are launched into the Western Test Range annually (Fujioka, 1993).

**Groups A and B.** Missile launches from North Vandenberg AFB, such as from LF-07 and LF-26, while not affecting land use itself (predominately the grazing of livestock), would have an impact on the property owners surrounding each launch site only if the LHAs were to extend off base. However, as stated previously, current and past landowner agreements exist that permit control of these areas during launch activities, allowing management of the population that could be affected by a launch and the minimization of hazards associated with launch mishap.

While the evacuation agreements with the owners of the land parcels under the LF-21 LHA lapsed in the late 1980s (Clemente, 1994), they could be re-negotiated, and land use itself would not be affected. Vandenberg AFB does have current evacuation agreements in place with owners of the parcels of land within the LF-07 LHA when it is extended off base (Schobel, 1994). Consequently, no impacts to land use are anticipated.

Activation for no more than 60 minutes of the North Vandenberg LHAs, especially at LF-07 and LF-26, would have a slight impact on recreational use of Point Sal State Beach. With some 14,950 visitors in 1993, closure of the access road would nominally affect only 9 individuals per hour during August, the busiest month, and as few as 2 individuals per hour during February, normally the least busy month, assuming the average daily number of visitors is evenly distributed over a typical 8-hour day.

**Group C.** Of the proposed launch sites, 576-E is in closest proximity to Ocean Beach County Park. However, activation of its LHA would not impact Ocean Beach County Park, since the missile would be traveling in a westerly direction. The limited land area between the site and the ocean would be evacuated. (Chapman, 1997)

Traffic data for the park (Pennington, 1994) shows that during the peak season (June, July, and August), 47 percent of the visitors come on the weekend; 74 percent come on the weekend during the off-season. Although the potential for weekend and evening launches exists, virtually all of the target launches would normally be scheduled during the week.

Nearby coastal areas, such as Wall Beach, which extends approximately 2.4 kilometers (1.5 miles) north of the park, may be temporarily affected if access is restricted. Located near 576-E, immediately north of the Wall Beach area and south of Purisima Point, is Seal Beach, another 5.6 kilometers (3.5 miles) of primarily rocky coastline, where Vandenberg AFB permits limited weekend and holiday access for surf fishing. Again, scheduling launches during the weekdays would preclude adverse impacts to recreational use of these land areas.

Use of the Rail Garrison, Test Pad-01, or the ABRES sites would neither impact current on-base land use for those areas nor necessitate the closure of Ocean Beach County Park.

### **South Vandenberg Air Force Base**

Launches from South Vandenberg AFB would be conducted in remote areas, far from county population centers. Previous missile launches were found to have no impact on land use in adjacent populated areas.

**Group D.** If launch site SLC-3W is used for the proposed action, the establishment and activation of its LHA could impact Ocean Beach County Park (4.7 kilometers [2.9 miles] away), as such a procedure would necessitate the closure of Coast Road, which leads to the park from the south, for no more than one hour. Whether or not temporary closure and evacuation of the park, itself, would be required is doubtful due to its distance from SLC-3W. Also, other access to the area would still be available. If determination were made that the park be closed, and assuming a typical 8-hour day for beach visitation, temporary closure would nominally affect as many as 30 visitors per hour during the peak season and as few as 19 visitors per hour during the off-season. Regardless, the limited launch/closure duration would have little overall impact.

The use of the SLC-5 site for launches would not impact current on-base land use for this area and would not necessitate the closure of Ocean Beach County Park.

**Group E.** Launches at the V-33 site would not necessitate the closure of Jalama Beach County Park, some 14.5 kilometers (9 miles) away, nor the closure of the sandy beach areas extending approximately 1.6 kilometers (1 mile) northwest of the park.

The establishment and activation of an LHA at all sites would require the temporary clearance of Pacific Ocean areas adjacent to the launch pad within the LHA. Such clearance (for up to five times every 2 months) could have an adverse impact on recreational and commercial use of these waters, particularly to sea urchin and abalone divers and lobster and crab trappers operating in shallower waters close to the Vandenberg shore. However, the LHA would be activated for less than 60 minutes, and adequate prior notice would be given to all fishing interests. Beach and park areas near Groups A, C, and D could be closed up to five times per year.

Planned debris dispersion will not encompass any of the four oil rigs near Group E. In addition, if target missiles are not equipped with an FTS, a mission impact statement will be required if the flight path is not approved, and overflight of oil platforms will be limited so that no more than two platforms are within the safety corridors per operation.

## **Coastal Consistency**

Federal agency activities in, or affecting, California's coastal zone must comply with section 307 of the Federal Coastal Zone Management Act (CZMA), 16 USC 1451-1464. These regulations require that Federal agencies ensure that their undertakings are consistent with the Federally approved state Coastal Zone Management Program (CZMP) for actions that may have impacts on the state's coastal zone. Although the act excludes Federal property from the definition of the coastal zone (16 USC 1453(1)), activities must still be consistent with California's CZMP if they produce impacts off Federal property and, as a result, any direct impacts to the state's coastal zone. In California, under the California CZMA of 1976, Chapter 3, Coastal Resources Planning and Management Policies, as amended, the state agency is the State Coastal Commission. It is anticipated that the TBM program would be found to be consistent with the goals and objectives of the California program, although a consistency determination has not been made at the time of this Preliminary Final Draft EA.

## **Cumulative Impacts**

Since the proposed activities would be using existing facilities and all missile launches must be scheduled and approved by 30 SW/SE, the possibility of adverse, incremental cumulative land use impacts on Vandenberg AFB is avoided. However, the potential does exist for cumulative, incremental impacts on (1) coastal access and recreational use of one of the two county parks or Point Sal State Beach and/or the additional public access beaches and coastline on Vandenberg AFB and (2) to offshore water (land) uses, particularly commercial fishing, depending on which launch site is eventually chosen for the program.

With an annual average of 15 to 20 existing missile launches for various other programs, the cumulative effect of the TMD Extended Test Range program's potential of 30 test flights per year, has the potential to double the number of road closures and beach evacuations as well as offshore LHA water area closures and evacuations at Vandenberg AFB. In addition to Vandenberg's ongoing and proposed missile program activities, other species and habitat protection programs, such as proposed seasonal beach access restrictions to protect the western snowy plover, have the potential to result in cumulative impacts on coastal access and recreation.

Given the already restricted coastal access in northern Santa Barbara County by virtue of its geography and property ownership patterns, further restrictions could be considered significant in a cumulative context without implementation of the mitigation measures outlined as follows:

- Potentially significant cumulative impacts on coastal access and recreation can be mitigated considerably by restricting launches to weekdays only.

- Similarly, potential adverse impacts on offshore commercial and sports fishing can be mitigated by ensuring that the same advance notice given to private land owners and affected Government agencies in the on-land LHAs be given to offshore users, particularly the California Sports Fishing Association and the various commercial fishing organizations and associations. With sufficient advance notice of activation of offshore LHAs, fishing boats can schedule their trips to avoid the LHA.
- Minimizing launches during the prime commercial fishing season (October-January) and avoiding weekend launches during the summer months for the sportfishing industry would also mitigate impacts.

## 4.7 NOISE

As previously stated, noise is defined as unwanted sound. There are three areas of concern for the proposed action: noise effects on local populace, noise effects on launch personnel, and noise effects on local wildlife.

### Proposed Action

The Hera-type missile is the noisiest of the proposed target missiles. However, it would only be launched from one of two possible locations. The PAAT is the loudest of the missiles proposed for launches throughout the ROI. Predicted maximum C-weighted sound pressure level contours of 85 dB and 92 dB for target missile launches are shown in figures 4-2 through 4-13, and also in appendix A. These maximum sound pressure levels would last for several seconds and then quickly taper off as the launch vehicle moves away. The terrain, relative humidity, and temperature would also have an effect on the noise level (U.S. Department of the Air Force, 1996).








The proposed action calls for a maximum of 30 launches annually, with no more than 5 launches every 2 months and a maximum of 5 launches occurring in a 3-day period for a particular exercise. Night launches may be included in the final program. Due to the short-term discrete nature of the launches, impacts are not expected to be substantial.

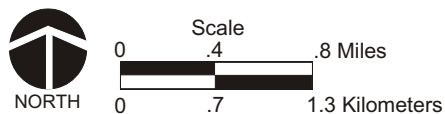
The maximum noise levels for the target missiles are greater than the 115 dB. Therefore, as required by the Occupational Safety and Health Administration, all non-essential personnel would be excluded from the launch area. Essential personnel would be required to follow established procedures to reduce noise exposure to within safe exposure levels. These procedures may include hearing protection (ear plugs) and evacuation to launch bunkers.

Noise impacts from launches and ground activities would be minimized by ensuring that personnel who must work close to the launch site wear hearing protection which would reduce the noise levels to prescribed health and safety levels. Other workers would be in blockhouses, which would attenuate the sound. As a result, noise impacts on launch personnel would be within both Federal and state limits.



#### EXPLANATION

- |   |   |   |   |
|---|---|---|---|
|  | Nesting Location of California Least Tern/ Western Snowy Plover |  | Roosting Location of California Brown Pelican |
|  | Launch Trajectory Azimuth                                       |  | Candidate Launch Site                         |
|  | Tidewater Goby  |  | Noise Contours                                |
|  | Unarmored Threespine Stickleback                                |   |   |

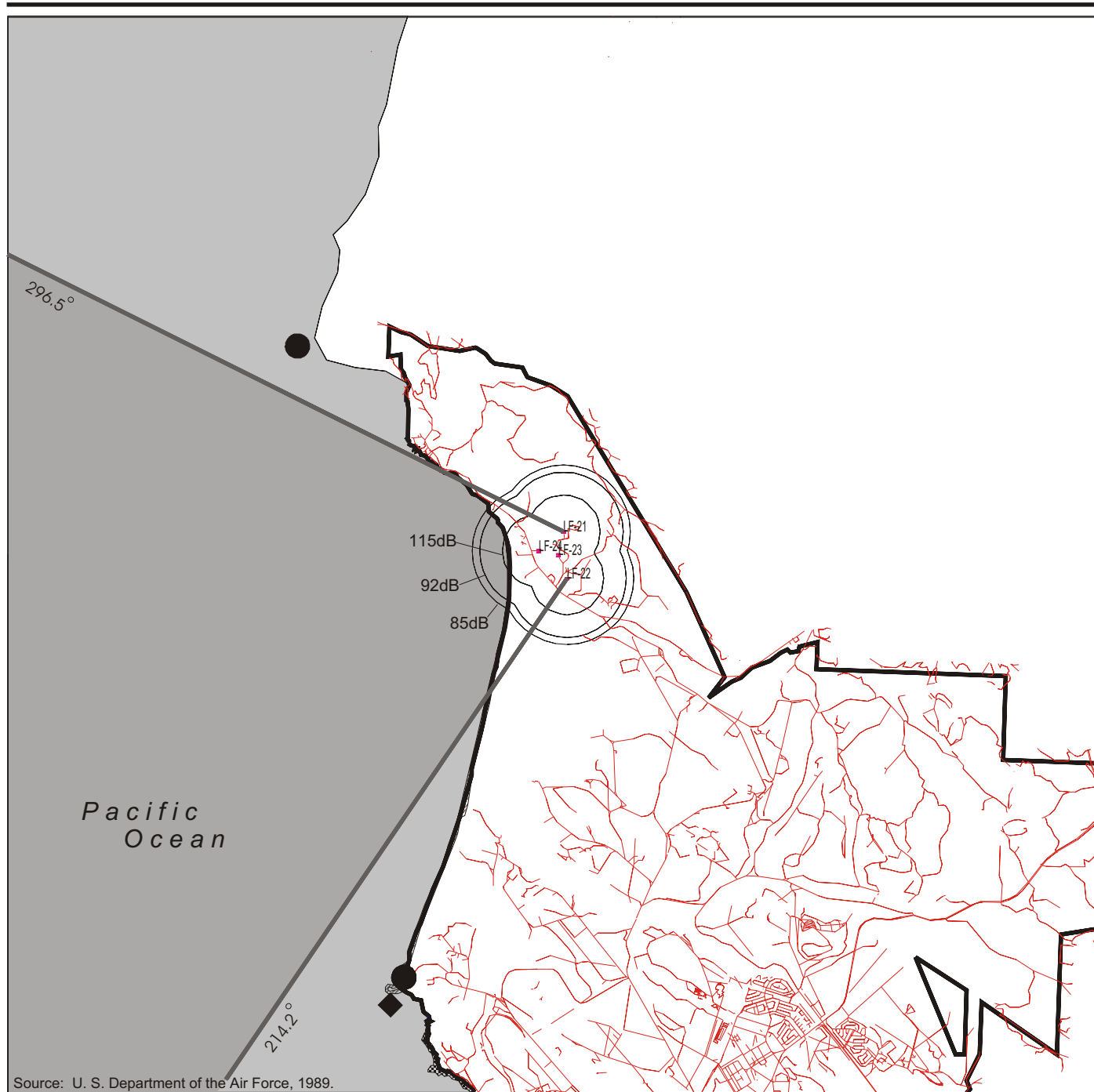


#### Maximum Noise Levels for Combined Launches of Lance Missiles, Group A (dB re 20 $\mu$ Pa)

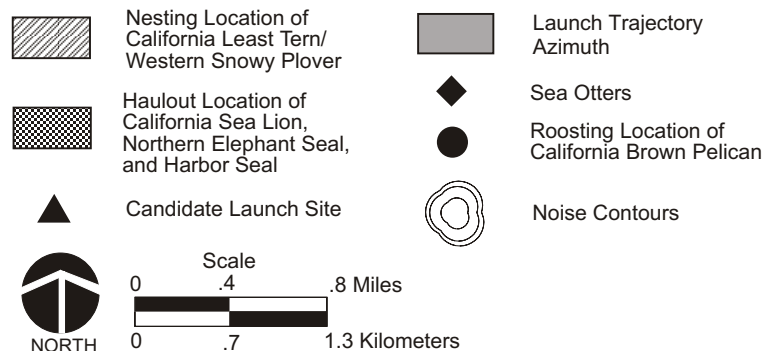
Vandenberg, AFB

Figure 4-2





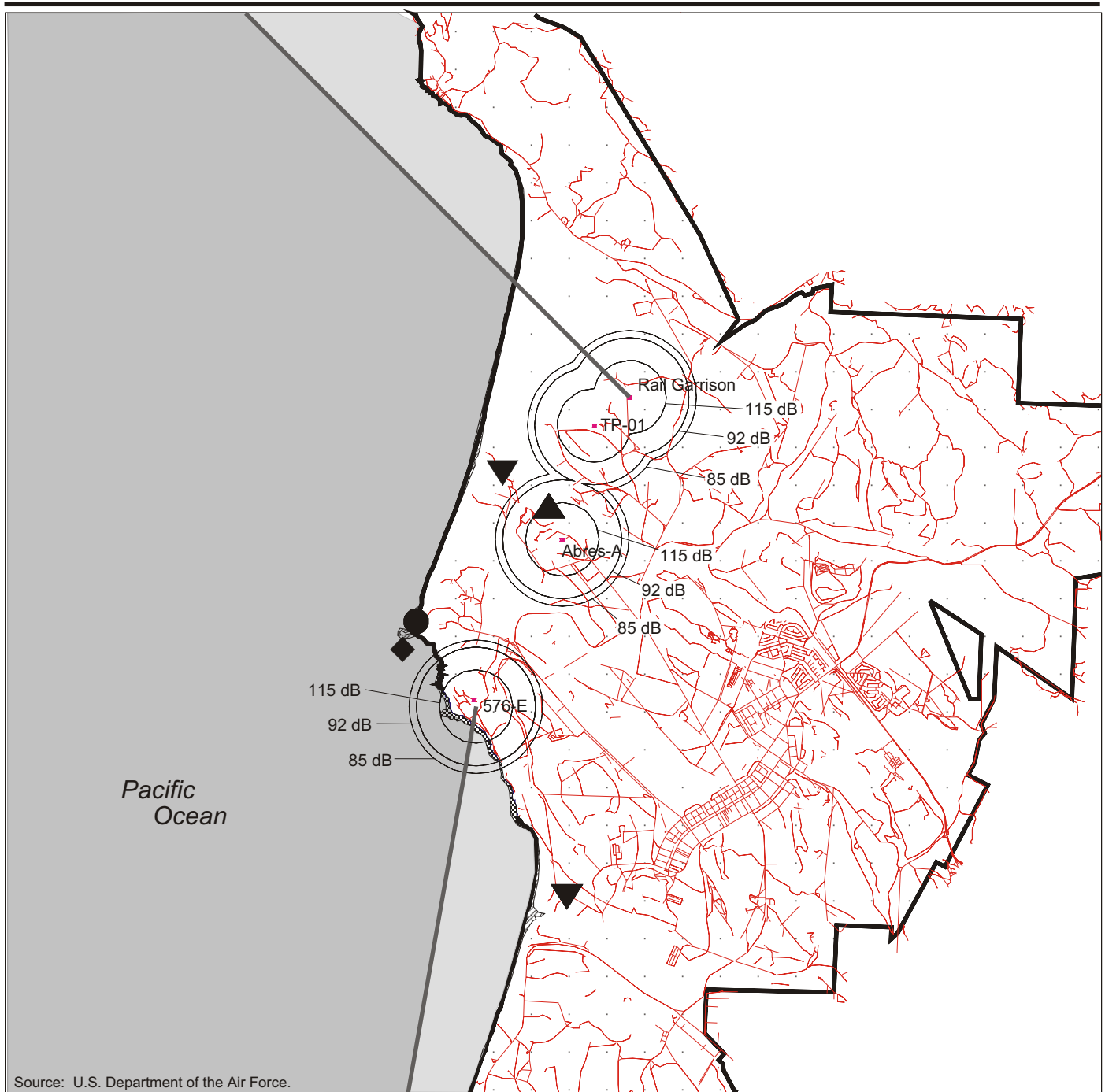
#### EXPLANATION












#### Maximum Noise Levels for Combined Launches of Lance Missiles, Group B (dB re 20 $\mu$ Pa)

Group B, Vandenberg AFB

**Figure 4-3**



#### EXPLANATION

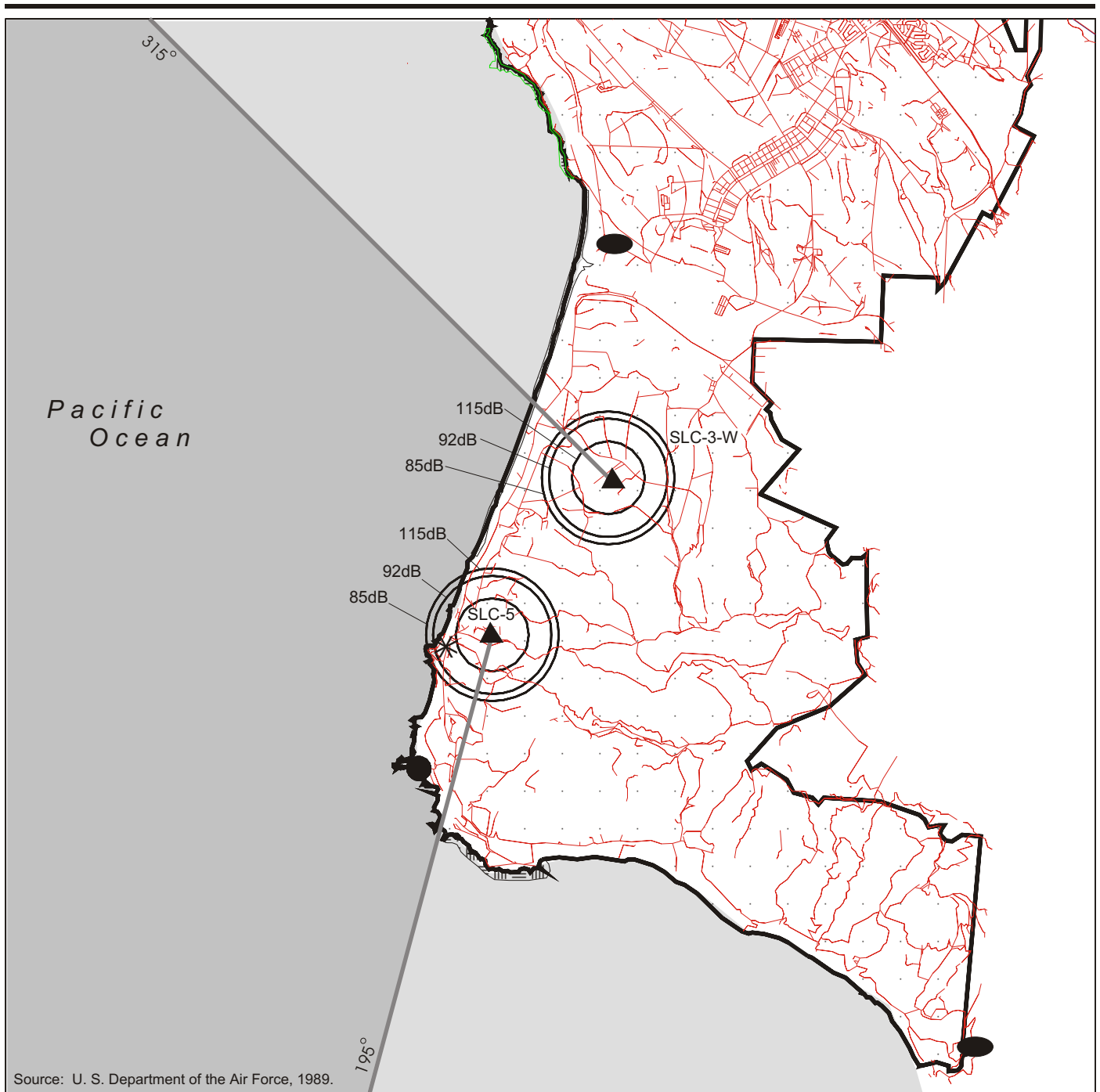
- |   |  |   |   |
|---|--|---|---|
|  | Nesting Location of California Least Tern/ Western Snowy Plover                  |  | Sea Otters                                    |
|  | Haulout Location of California Sea Lion, Northern Elephant Seal, and Harbor Seal |  | Roosting Location of California Brown Pelican |
|  | Launch Trajectory Azimuth  |  | Tidewater Goby                                |
|  |  |  | Unarmored Threespined Stickleback             |
|   |  |  | Noise Contours                                |

Scale  
0 .4 .8 Miles  
0 .7 1.3 Kilometers

#### Maximum Noise Levels for Combined Launches of Lance Missiles, Group C (dB re 20 $\mu$ Pa)

Vandenberg AFB

Figure 4-4



## EXPLANATION



Nesting Location of  
California Least Tern/  
Western Snowy Plover



Launch Trajectory  
Azimuth



Tidewater Goby



Unarmored Threespine  
Stickleback



Haulout Location of  
California Sea Lion,  
Northern Elephant Seal,  
and Harbor Seal



Roosting Location of  
California Brown Pelican



Candidate Launch Site



Noise Contours



NORTH

Scale

0 .4 .8 Miles

0 .7 1.3 Kilometers

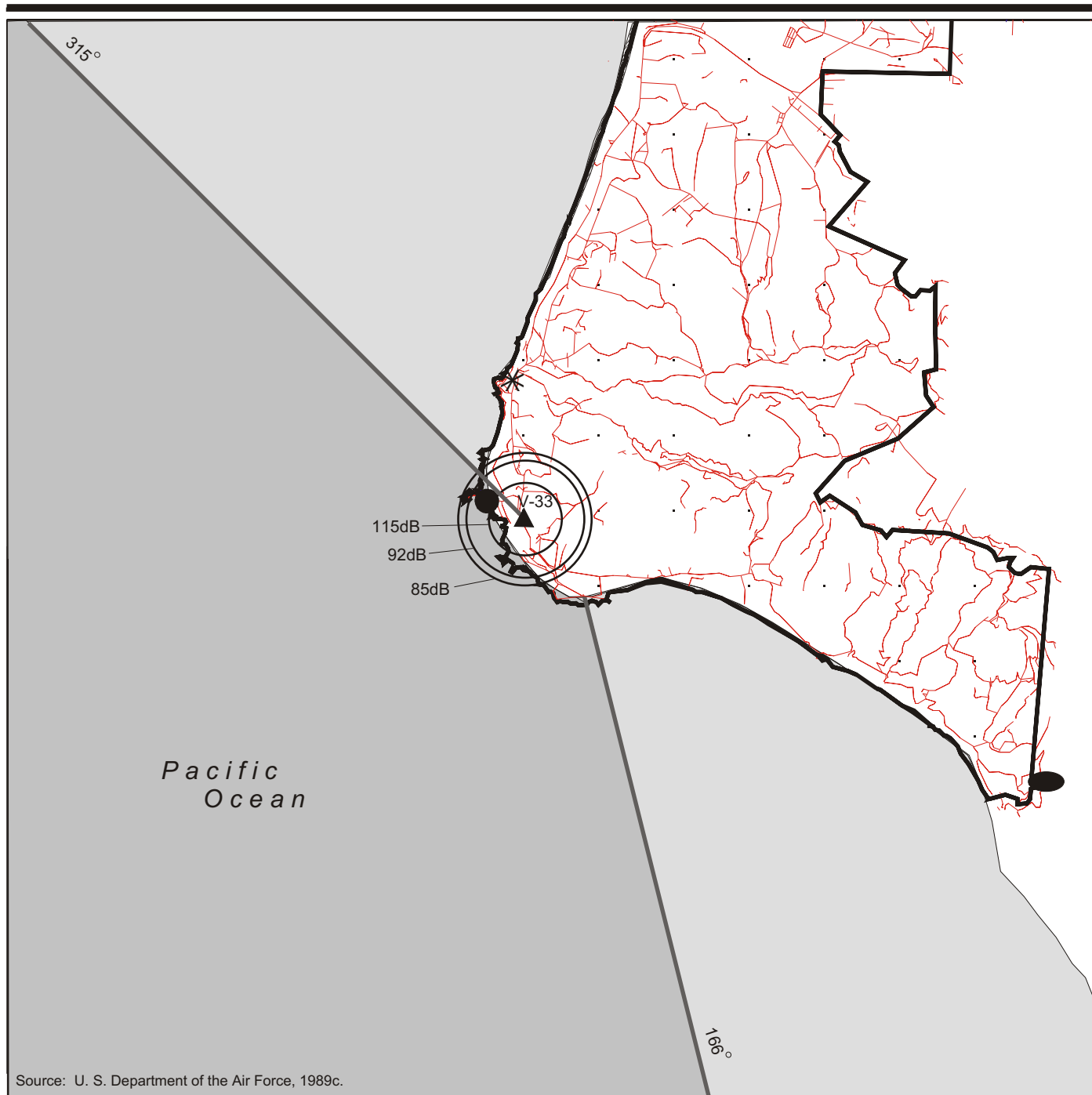
Lance045

## Maximum Noise Levels for Combined Launches of Lance Missiles, Group D (dB re 20 Pa)

Vandenberg AFB

Figure 4-5

TBM Targets EA



#### EXPLANATION



Nesting Location of  
California Least Tern/  
Western Snowy Plover



Tidewater Goby



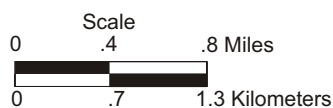
Unarmored Threespine  
Stickleback



Candidate Launch Site



NORTH



Launch Trajectory  
Azimuth



Roosting Location of  
California Brown Pelican

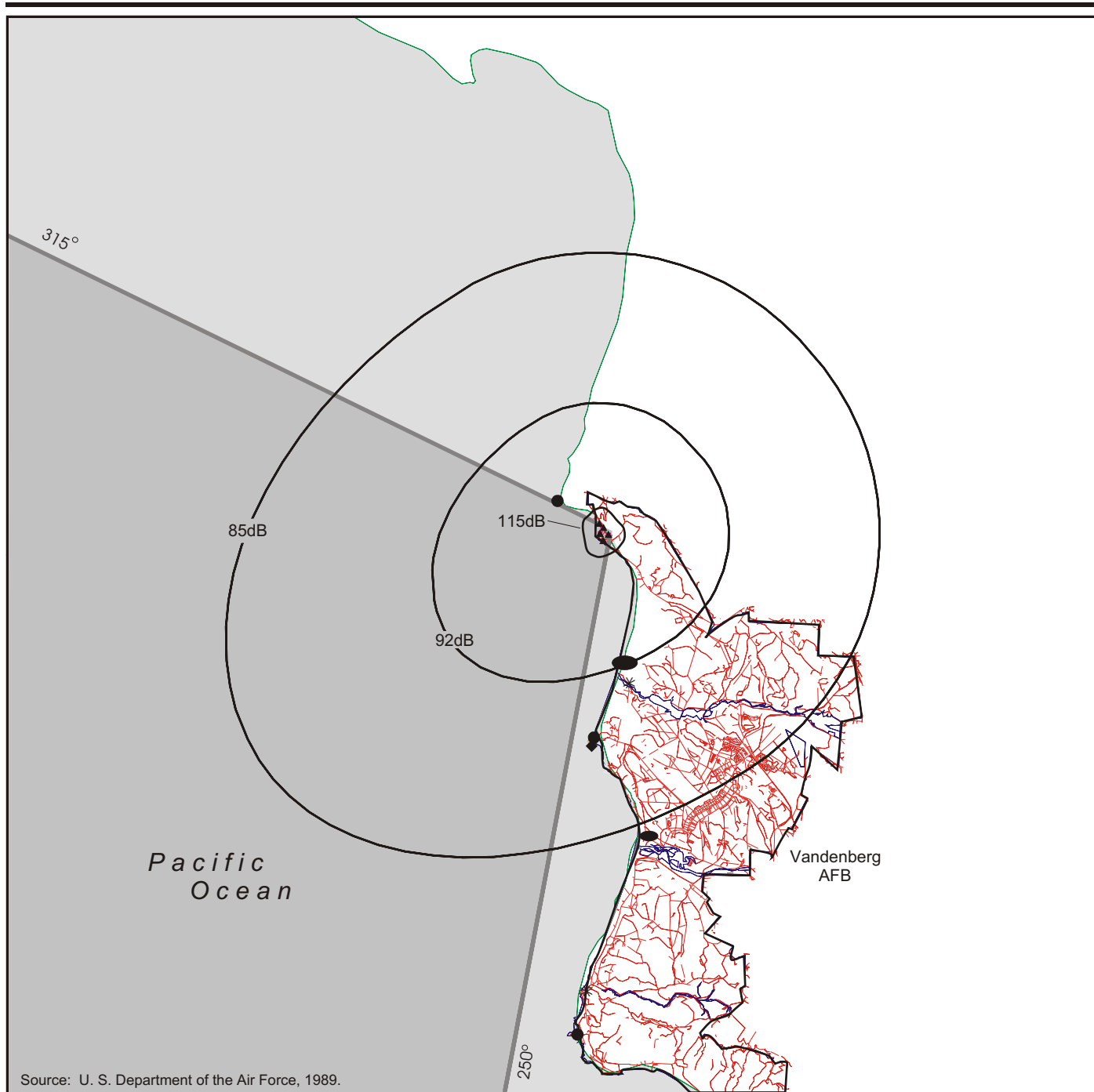


Noise Contours

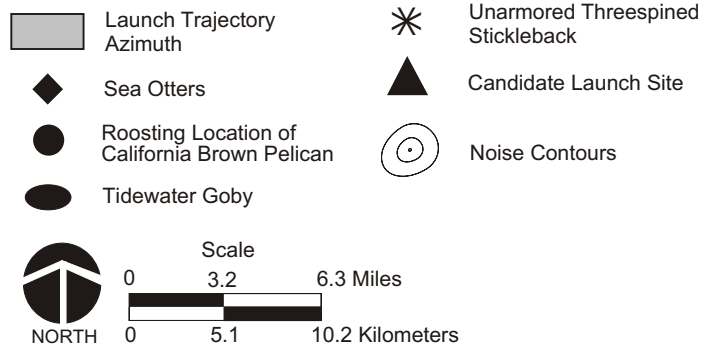
**Maximum Noise Levels  
for Combined  
Launches of Lance  
Missiles, Group E  
(dB re 20  $\mu$ Pa)**

**Vandenberg AFB**

**Figure 4-6**



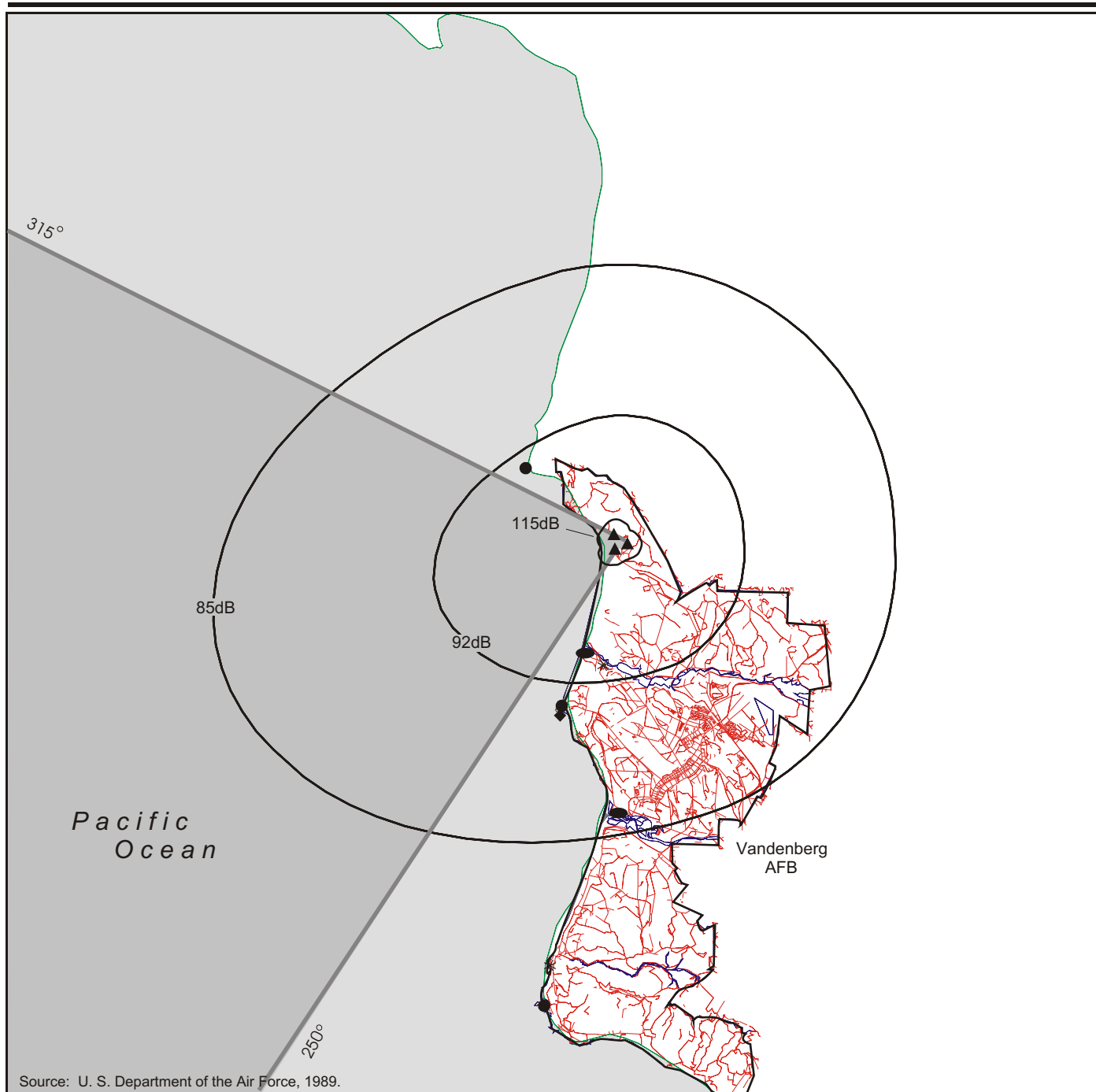
#### EXPLANATION



#### Maximum Noise Levels for Combined Launches of PAAT Missiles, Group A (dB re 20 $\mu$ Pa)

Vandenberg AFB

**Figure 4-7**



## EXPLANATION

Launch Trajectory Azimuth

Candidate Launch Site

Sea Otters

Tidewater Goby

Roosting Location of California Brown Pelican

Unarmored Threespined Stickleback

Noise Contours



NORTH

Scale

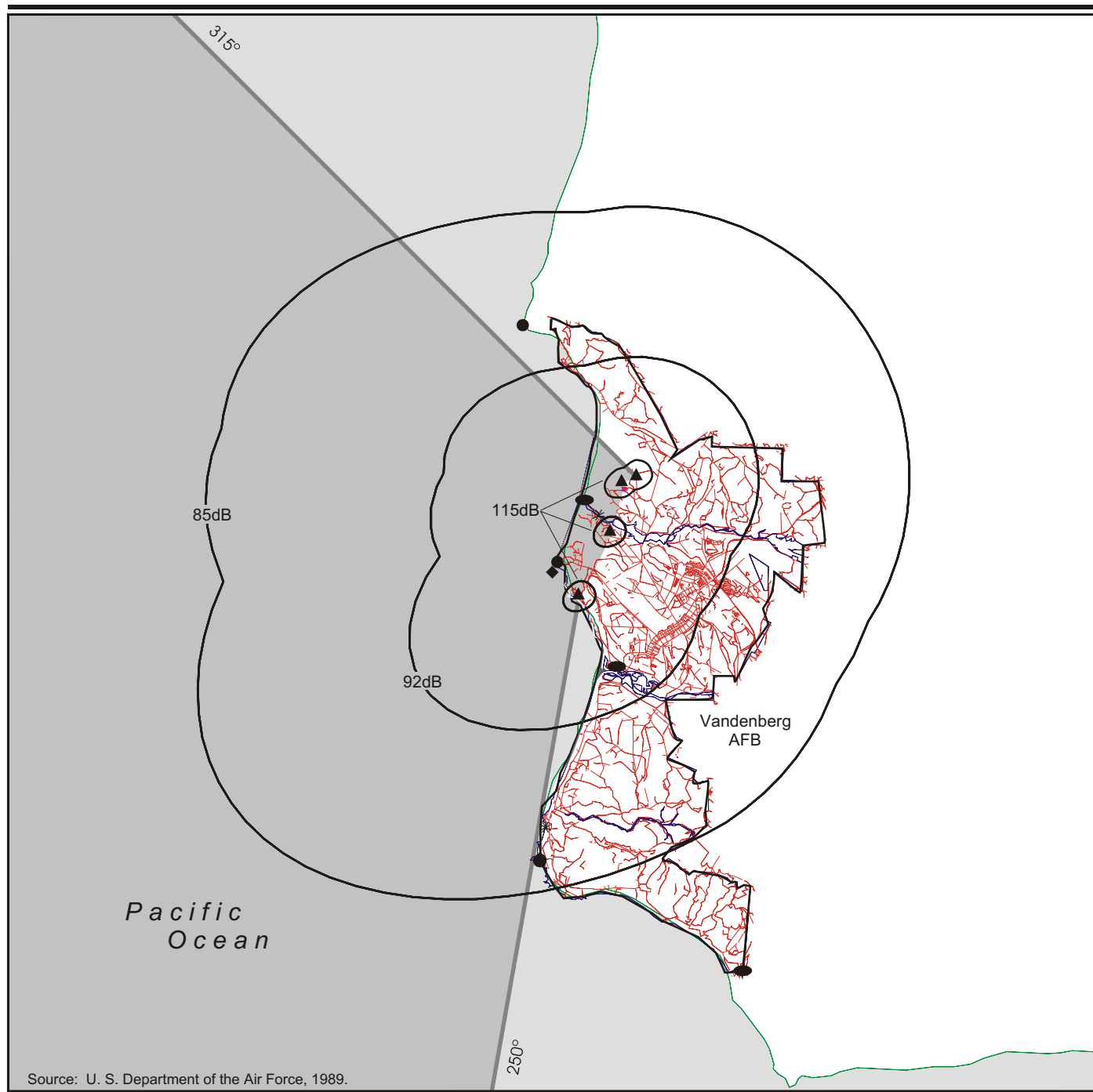
0 3.2 6.3 Miles

0 5.1 10.2 Kilometers

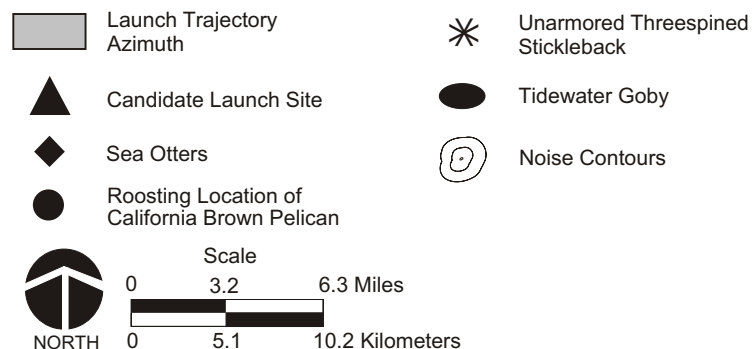
## Maximum Noise Levels for Combined Launches of PAAT Missiles, Group B (dB re 20 $\mu$ Pa)

Vandenberg AFB

Figure 4-8



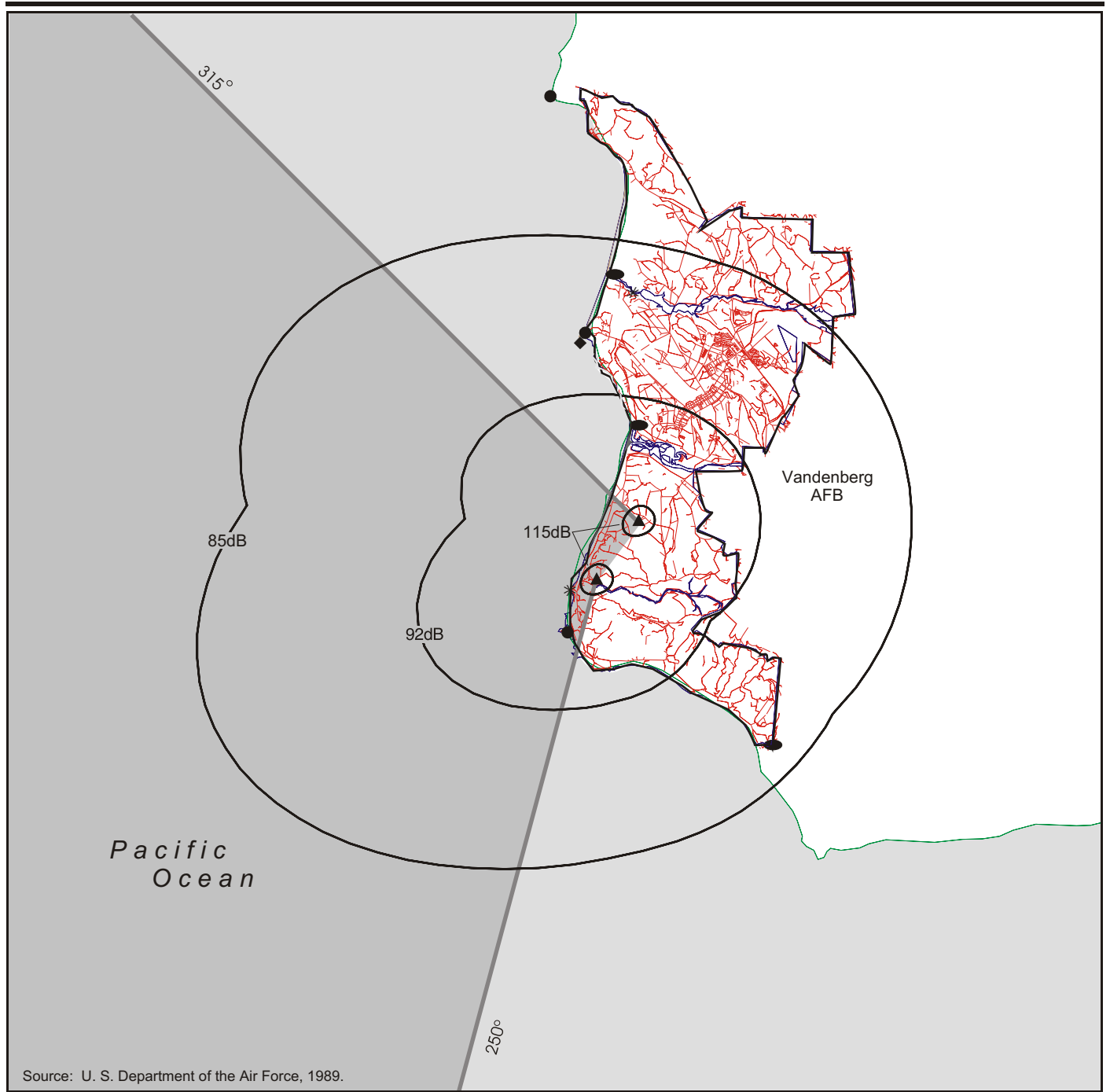
#### EXPLANATION



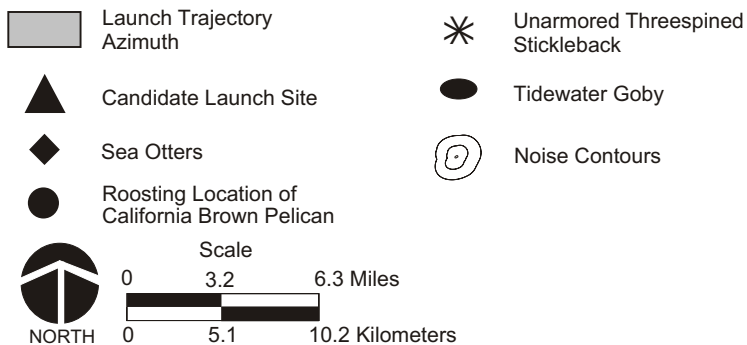
#### Maximum Noise Levels for Combined Launches of PAAT Missiles, Group C (dB re 20 Pa)

Vandenberg AFB

**Figure 4-9**



#### EXPLANATION

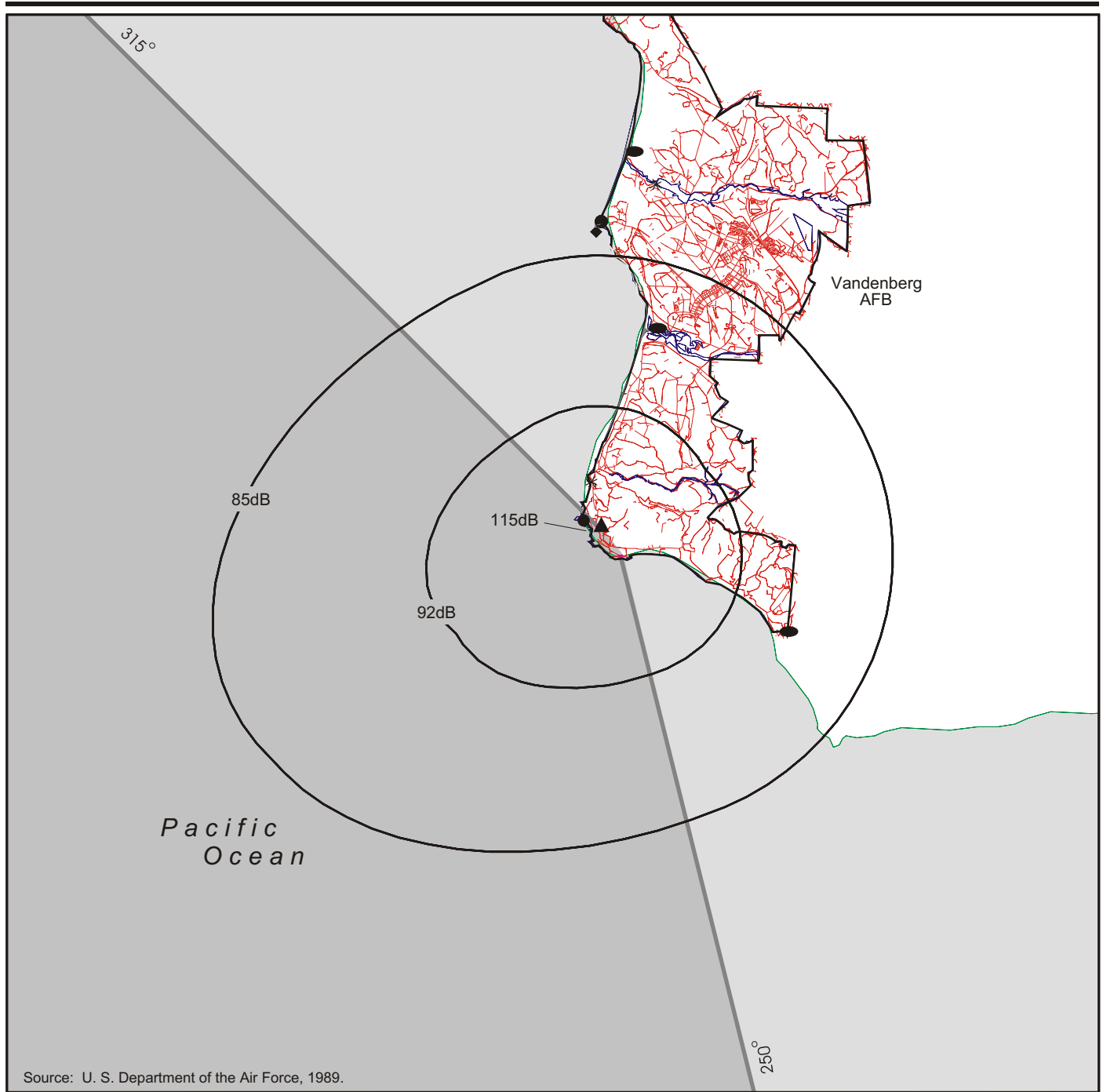


#### Maximum Noise Levels for Combined Launches of PAAT Missiles, Group D (dB re 20 Pa)

Vandenberg AFB

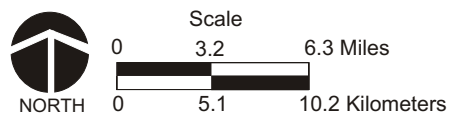
Figure 4-10





#### EXPLANATION

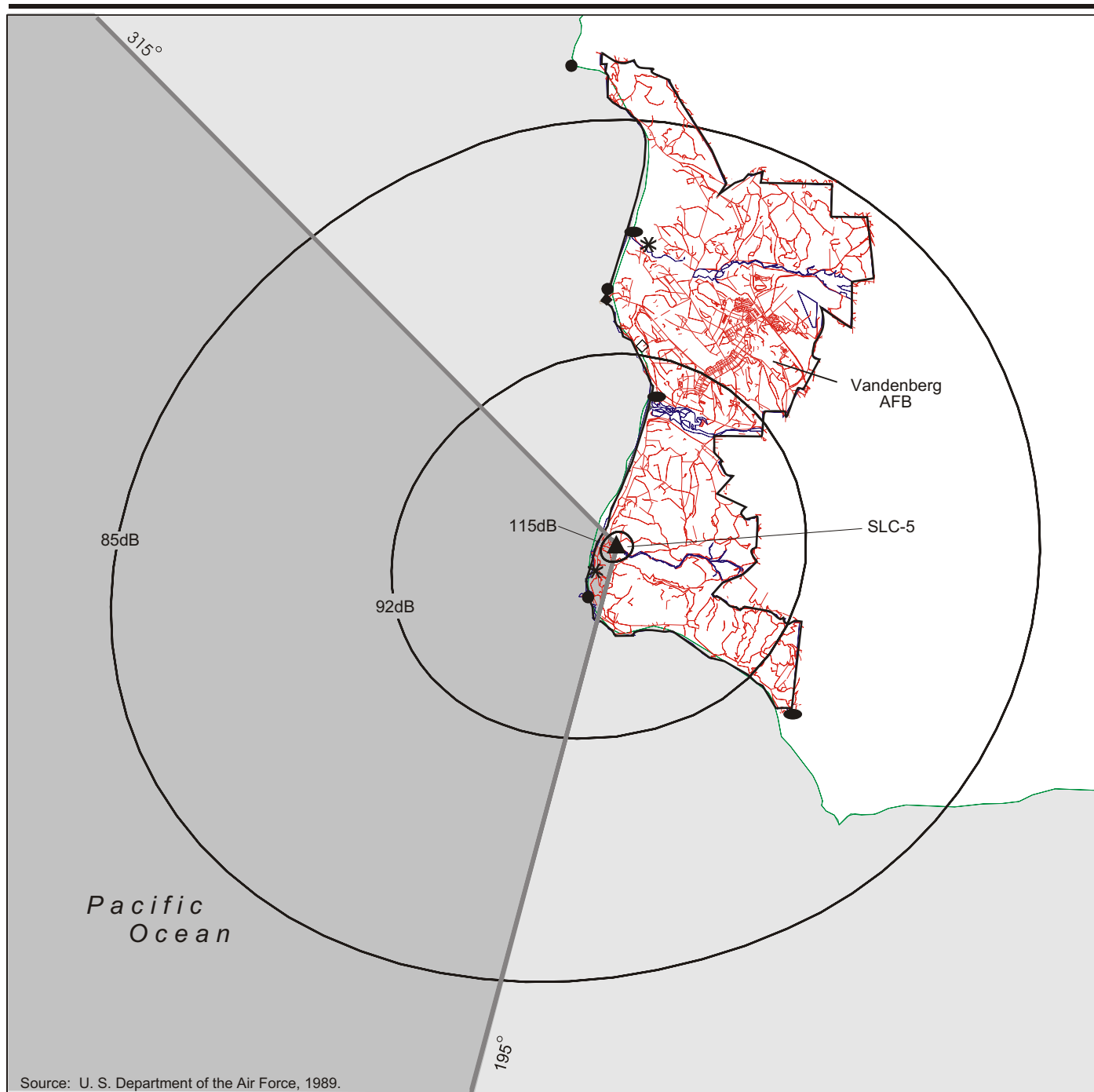
- |  |   |  |                                   |
|--|---|--|-----------------------------------|
|  | Launch Trajectory Azimuth                     |  | Unarmored Threespined Stickleback |
|  | Tidewater Goby                                |  | Candidate Launch Site             |
|  | Sea Otters                                    |  | Noise Contours                    |
|  | Roosting Location of California Brown Pelican |  |                                   |



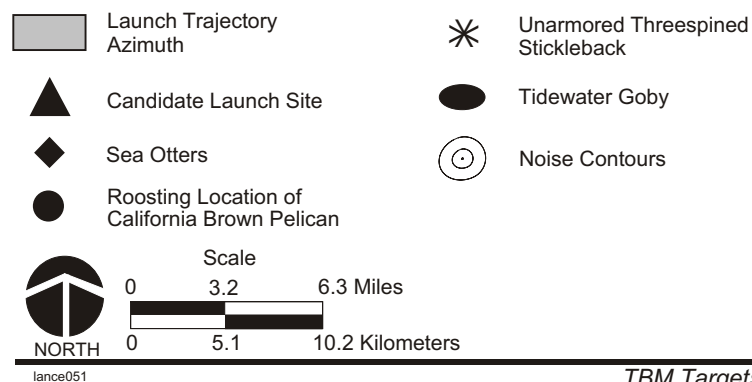
#### Maximum Noise Levels for Combined Launches of PAAT Missiles, Group E (dB re 20 $\mu$ Pa)

Vandenberg AFB

**Figure 4-11**



#### EXPLANATION



#### Maximum Noise Levels for Single Rail Launch of Hera Missile, SLC-5 (dB re 20 $\mu$ Pa)

Vandenberg AFB

**Figure 4-12**



The 92 dB sound contour encompasses habitats of several sensitive species. As noted previously, past assessments have used the 92 dB sound level as a level of concern. The major concern is the abandonment of young, causing a reduction in the population. This concern could be mitigated by selecting sites during the species' mating season that do not result in high sound levels encroaching on the habitats.

Conditions and measures required for South Vandenberg are similar to those for North Vandenberg.

### **Cumulative Impacts**

No cumulative impacts are expected.

## **4.8 ENVIRONMENTAL EFFECTS OF THE NO-ACTION ALTERNATIVE**

If the no-action alternative is selected, no environmental consequences associated with target launches are anticipated. Present activities would continue at the proposed program locations with no change in current operations.

## **4.9 ADVERSE ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED**

Adverse environmental effects that cannot be avoided include the release of small amounts of pollutants into the atmosphere; minor noise impacts on wildlife; disturbance of vegetation and sensitive habitats; erosion of soils; minor increased generation of hazardous materials; potential increase in personnel exposure to electromagnetic radiation (EMR); closure of public roads and limited restriction of recreation areas; and increased noise levels at the launch sites. However, through implementation of the program actions described within this document, these effects can be minimized.

## **4.10 CONFLICTS WITH FEDERAL, STATE, AND LOCAL LAND USE PLANS, POLICIES, AND CONTROLS FOR THE AREA CONCERNED**

Land use planning would follow the Installation Master Plan and the requirements of section III (Chapter 2) of AR 200-1. In addition, target missile testing activities would comply with Federal, state, and local laws and regulations.

Target missile launches from the existing launch sites on Vandenberg AFB would have no impact on land use itself and present no conflicts with Federal, regional, state, local, or American Indian land use plans, policies, or controls since Vandenberg AFB has been designated and devoted to supporting missile test and development programs.

## **4.11 ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL**

Anticipated energy requirements of program activities can be accommodated within the energy supply of the region. Energy requirements would be subject to any established energy conservation practices.

#### **4.12 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES**

The amount of materials and energy required for any program-related activities would be small. Although the proposed activities would result in some irreversible and irretrievable commitment of resources such as various metallic materials, minerals, and labor, this commitment of resources is not significantly different from that necessary for many other defense research and development programs. It is similar to the activities that have been carried out in previous defense programs over the past several years.

#### **4.13 RELATIONSHIP BETWEEN SHORT-TERM USE OF THE HUMAN ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY**

Activities at all locations would take advantage of existing facilities and infrastructure with minor construction possibly required; therefore, the proposed action does not eliminate any options for future use of the environment for the locations under consideration.

#### **4.14 NATURAL OR DEPLETABLE RESOURCE REQUIREMENTS AND CONSERVATION POTENTIAL**

Other than the use of various structural materials and fuels, no significant use of natural or depletable resources is required by the proposed target missile launches.

#### **4.15 FEDERAL ACTIONS TO ADDRESS ENVIRONMENTAL JUSTICE IN MINORITY POPULATIONS AND LOW-INCOME POPULATIONS (EXECUTIVE ORDER 12898)**

The target missile launch program would be conducted in a manner that would not substantially affect human health or the environment. The environmental assessment has identified no effects that would result in disproportionately high or adverse effect on minority or low-income populations in the area. The activities would also be conducted in a manner that would not exclude persons from participation in, deny persons the benefits of, or subject persons to discrimination under the test program because of their race, color, or national origin.

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## 6.0 List of Preparers

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## 6.0 LIST OF PREPARERS

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### Government Preparers

David Hasley, Environmental Engineer  
U.S. Army Space and Strategic Defense Command  
B.Sc., 1984, Mechanical Engineering, University of Texas, Arlington  
Area of Responsibility: EA Program Management  
Years of Experience: 6

### Contractor Preparers

Rusty Anchors, Environmental Planner  
EDAW, Inc.  
B.A., 1993, Anthropology, University of New Mexico  
Years of Experience: 4

Jessaka Bailey, Environmental Scientist  
EDAW, Inc.  
B.S., 1996, Biology, University of Alabama in Huntsville  
Years of Experience: 1

Mark Bennett, Environmental Specialist  
EDAW, Inc.  
Ph.D., 1990, Chemical Engineering, Massachusetts Institute of Technology  
B.S.E., 1982, Bioengineering, University of Pennsylvania  
Years of Experience: 5

Michael Carstensen, Staff Environmental Specialist  
EDAW, Inc.  
B.S. (in process), Chemical Engineering, University of Alabama in Huntsville  
Years of Experience: 1

Chris Chartrand, Senior Engineer  
Teledyne Brown Engineering  
B.S., 1987, Mechanical Engineering, Tennessee Technological University, Cookeville  
Years of Experience: 9

Sue Edwards, AICP  
EDAW, Inc.  
M.R.P., 1984, Regional Planning, University of North Carolina  
B.S., 1975, Mass Communications, Virginia Commonwealth University  
Years of Experience: 17

Amy Fenton, Technical Editor  
EDAW, Inc.  
B.S., 1988, Biology, University of Alabama in Huntsville  
Years of Experience: 9

Rachel Jordan, Environmental Scientist

EDAW, Inc.

B.S., 1972, Biology, Christopher Newport College

Years of Experience: 9

Edd Joy, Senior Associate Environmental Planner

EDAW, Inc.

B.A., 1974, Geography, California State University, Northridge

Years of Experience: 22

Rickie D. Moon, Environmental Analyst

Teledyne Brown Engineering

B.S., 1977, Chemistry/Mathematics, Samford University

Years of Experience: 11

John K. Sollid, AICP, Senior Associate Environmental Planner

EDAW, Inc.

B. Architecture, 1968, Tulane University

Years of Experience: 22

H. Conrad Meyer IV, Senior Engineer

Teledyne Brown Engineering

M.B.A., 1995, Florida Institute of Technology

M.S., 1993, Management, Florida Institute of Technology

B.EE., 1989, Electrical Engineering, Auburn University

Years of Experience: 5

James E. Zielinski, Environmental Planner

EDAW, Inc.

B.S., 1984, Biology, University of Alabama in Birmingham

Years of Experience: 10

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## 7.0 Agencies Contacted

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## 7.0 AGENCIES CONTACTED

---

Vandenberg Air Force Base  
30<sup>th</sup> Space Wing  
Vandenberg AFB, California

Department of the Army  
Office of the Judge Advocate  
Arlington, Virginia

U.S. Department of the Interior  
Fish and Wildlife Service  
Vandenberg AFB, California

U.S. Department of Commerce  
National Marine Fisheries Service  
Long Beach, California

California Coastal Commission  
San Francisco, California

Santa Barbara County Air Pollution Control District  
Goleta, California

Teledyne Brown Engineering  
Huntsville, Alabama

Vista Technologies  
Huntsville, Alabama

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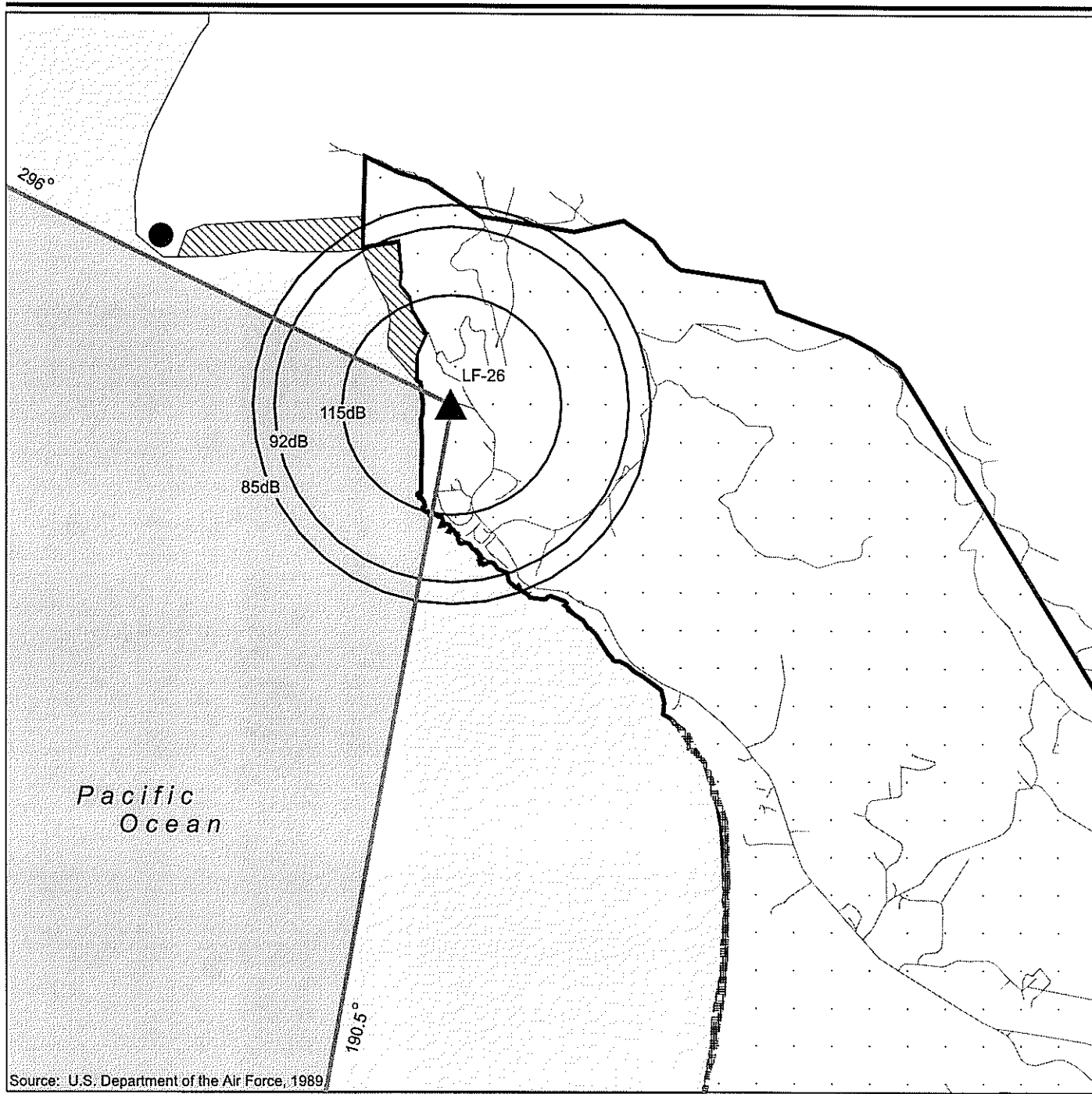
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## Appendix A

### Noise Figures

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#### EXPLANATION



Nesting Location of  
California Least Tern/  
Western Snowy Plover



Launch Trajectory  
Azimuth



Point Sal Beach  
State Park



Noise Contours



Candidate Launch Site



Roosting Location of  
California Brown Pelican

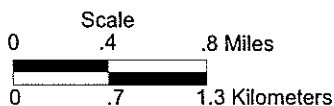
**Maximum Noise Levels  
for Single Launch of  
Lance Missile  
(dB re 20  $\mu$ Pa) at LF-26**

Group A, Vandenberg AFB

**Figure A-1**

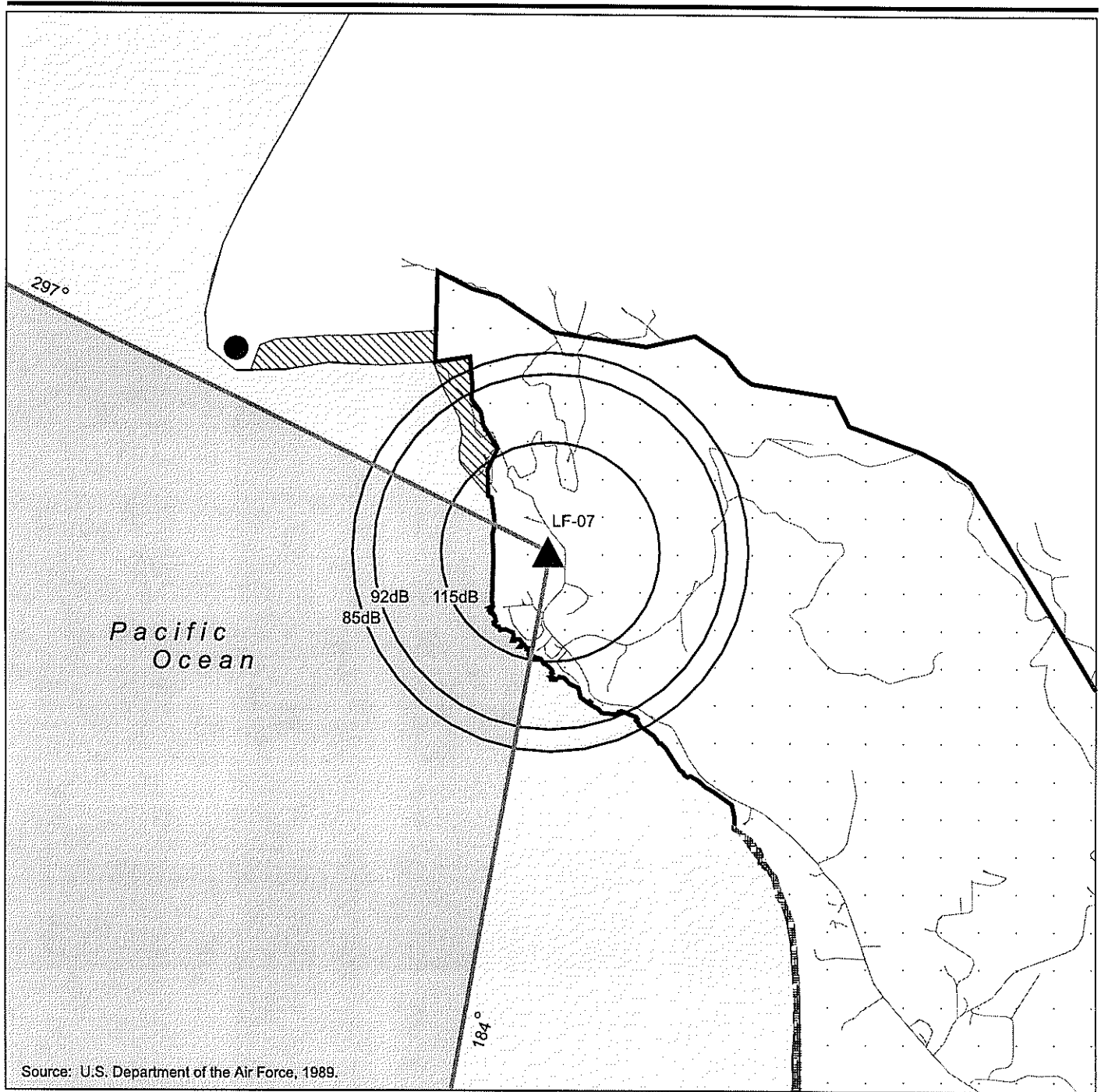


NORTH



cdtr032lance

TBM Targets EA



#### EXPLANATION



Nesting Location of  
California Least Tern/  
Western Snowy Plover



Launch Trajectory  
Azimuth



Point Sal Beach  
State Park



Noise Contours



Candidate Launch Site



Roosting Location of  
California Brown Pelican

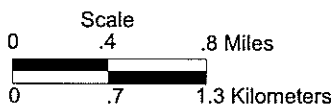
**Maximum Noise Levels  
for Single Launch of  
Lance Missile  
(dB re 20  $\mu$ Pa) at LF-07**

Group A, Vandenberg AFB

**Figure A-2**

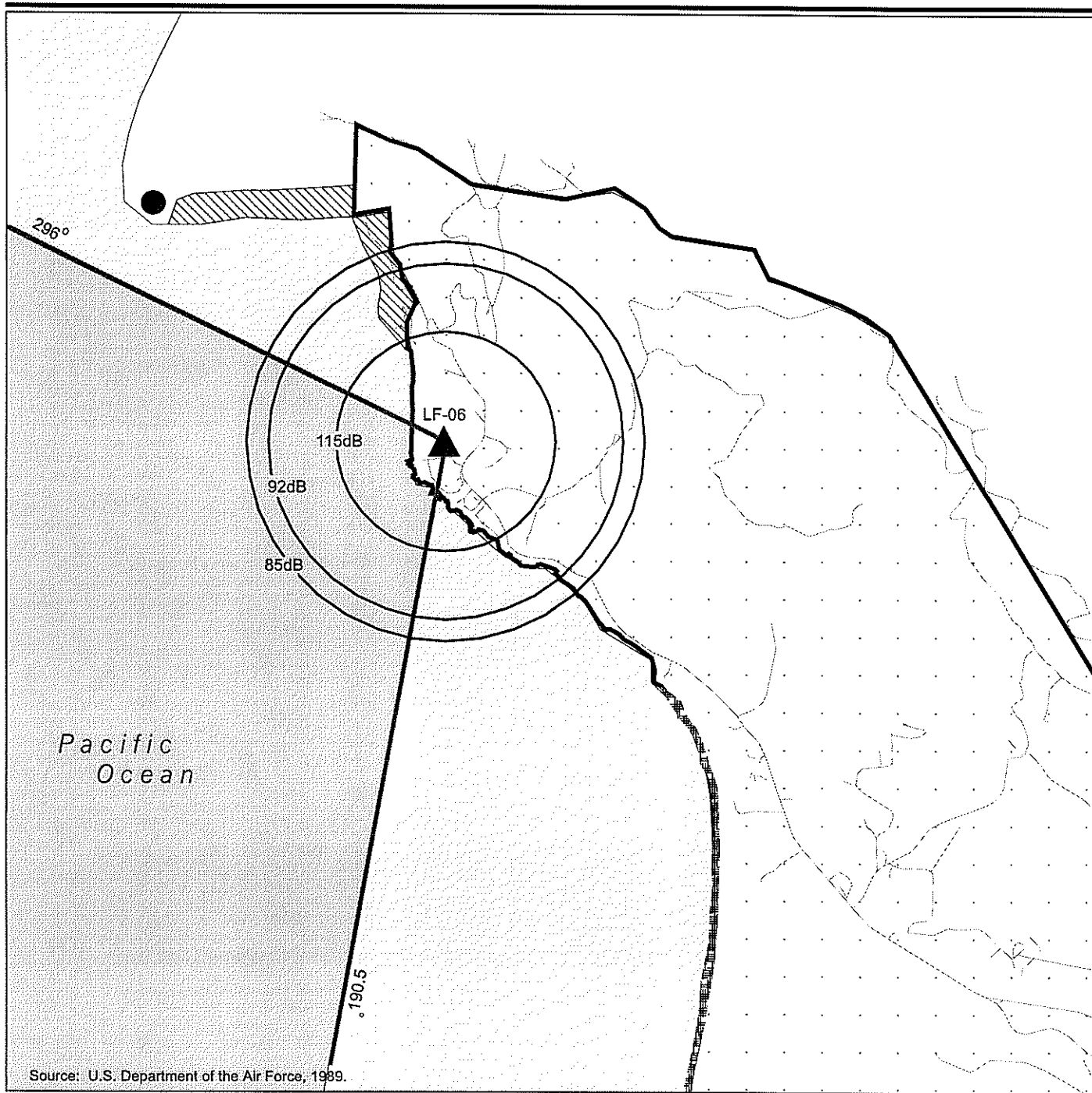


NORTH









lance012

TBM Targets EA



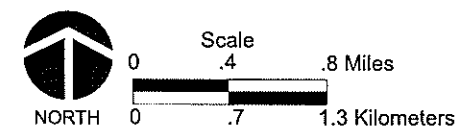
#### EXPLANATION

- |   |   |   |   |
|---|---|---|---|
|  | Nesting Location of California Least Tern/ Western Snowy Plover |  | Noise Contours                                |
|  | Launch Trajectory Azimuth                                       |  | Candidate Launch Site                         |
|  | Point Sal Beach State Park                                      |  | Roosting Location of California Brown Pelican |

### Maximum Noise Levels for Single Launch of Lance Missile (dB re 20 $\mu$ Pa) at LF-06

Group A, Vandenberg AFB

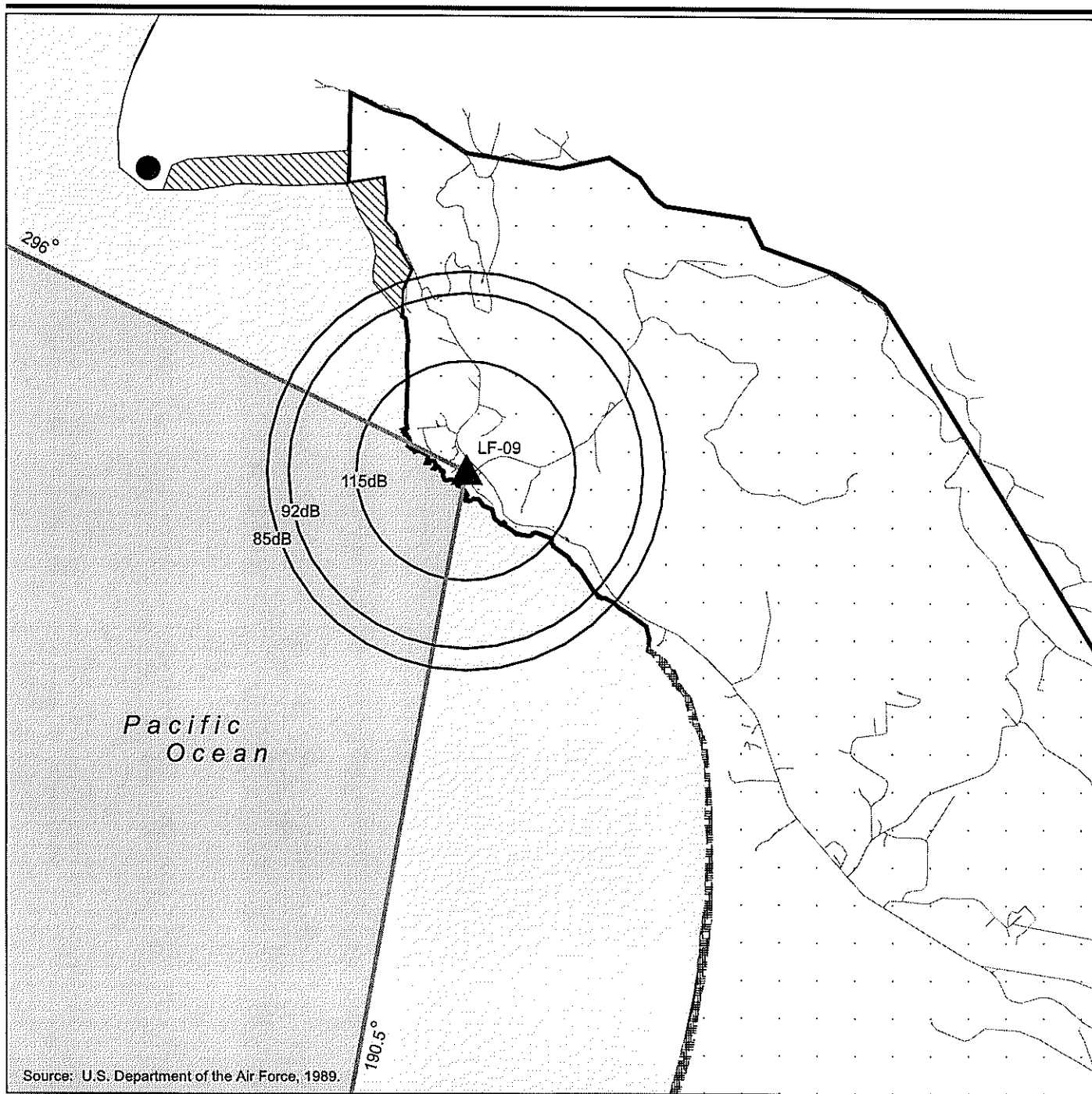
**Figure A-3**



lance034

TBM Targets EA

A-3



#### EXPLANATION



Nesting Location of  
California Least Tern/  
Western Snowy Plover



Launch Trajectory  
Azimuth



Point Sal Beach  
State Park



Noise Contours



Candidate Launch Site



Roosting Location of  
California Brown Pelican

**Maximum Noise  
Levels for Single  
Launch of Lance  
Missile (dB re 20  $\mu$ Pa)  
at LF-09**

Group A, Vandenberg AFB

**Figure A-4**

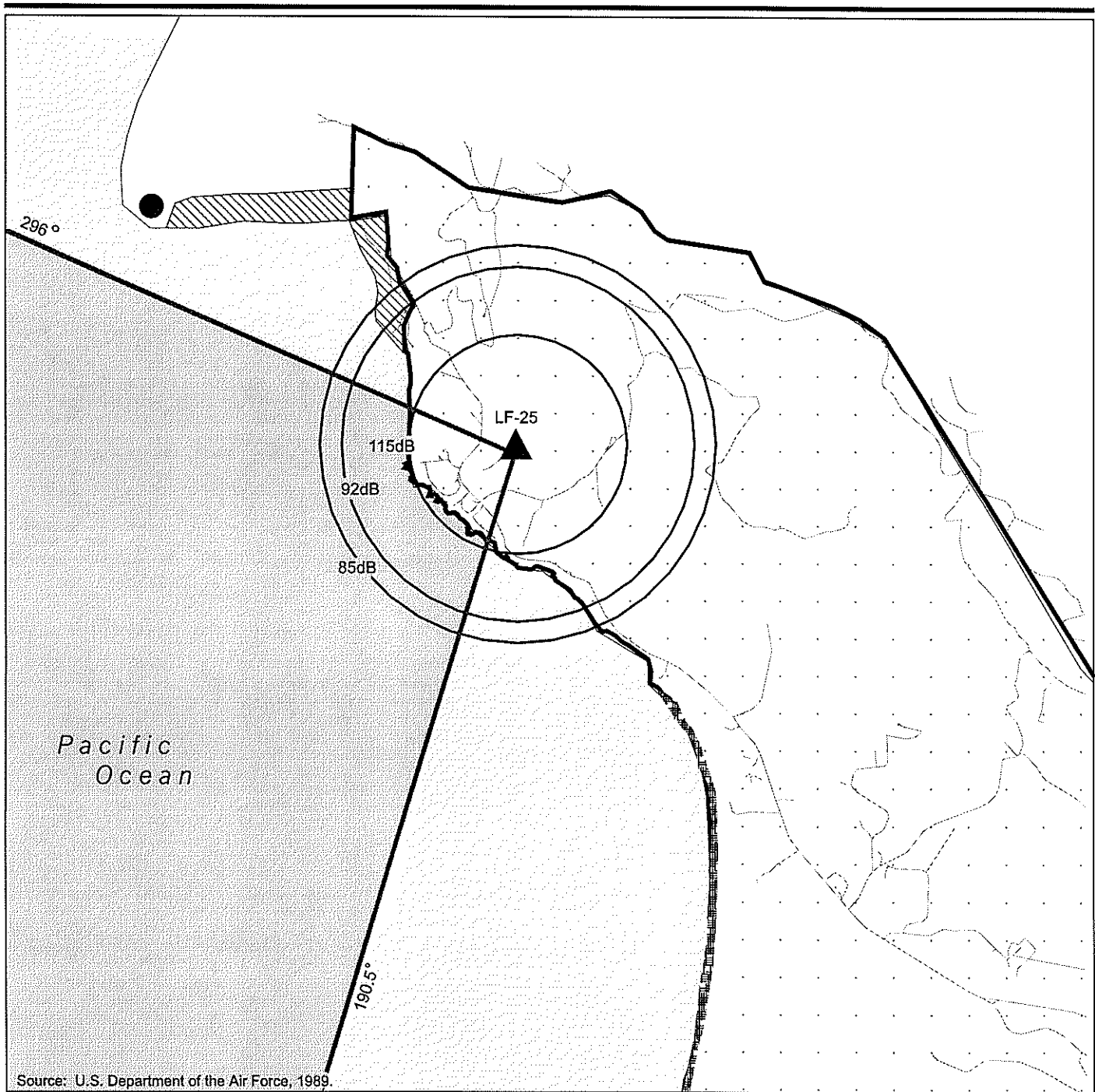


NORTH

Scale  
0 .4 .8 Miles  
0 .7 1.3 Kilometers

cd/rfance035

TBM Targets EA



#### EXPLANATION



Nesting Location of  
California Least Tern/  
Western Snowy Plover



Launch Trajectory  
Azimuth



Point Sal Beach  
State Park



Noise Contours



Candidate Launch Site



Roosting Location of  
California Brown Pelican

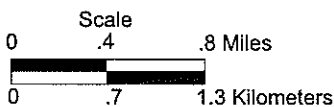
### Maximum Noise Levels for Single Launch of Lance Missile (dB re 20 $\mu$ Pa) at LF-25

Group A, Vandenberg AFB

Figure A-5



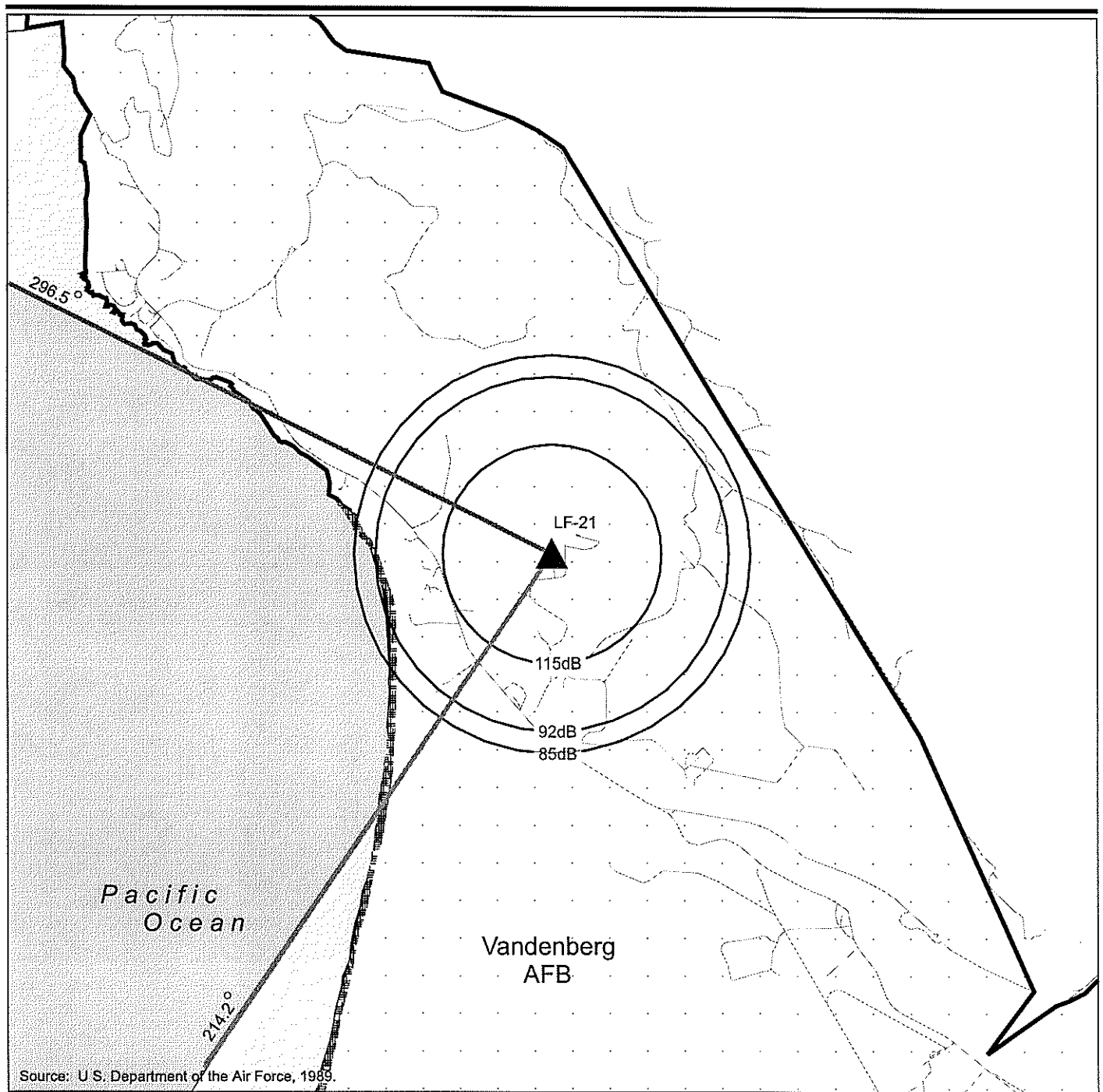
NORTH



lance036

TBM Targets EA

A-5



#### EXPLANATION



Nesting Location of  
California Least Tern/  
Western Snowy Plover



Launch Trajectory  
Azimuth



Noise Contours



Candidate Launch Site

**Maximum Noise Levels  
for Single Launch of  
Lance Missile  
(dB re 20  $\mu$ Pa) at LF-21**



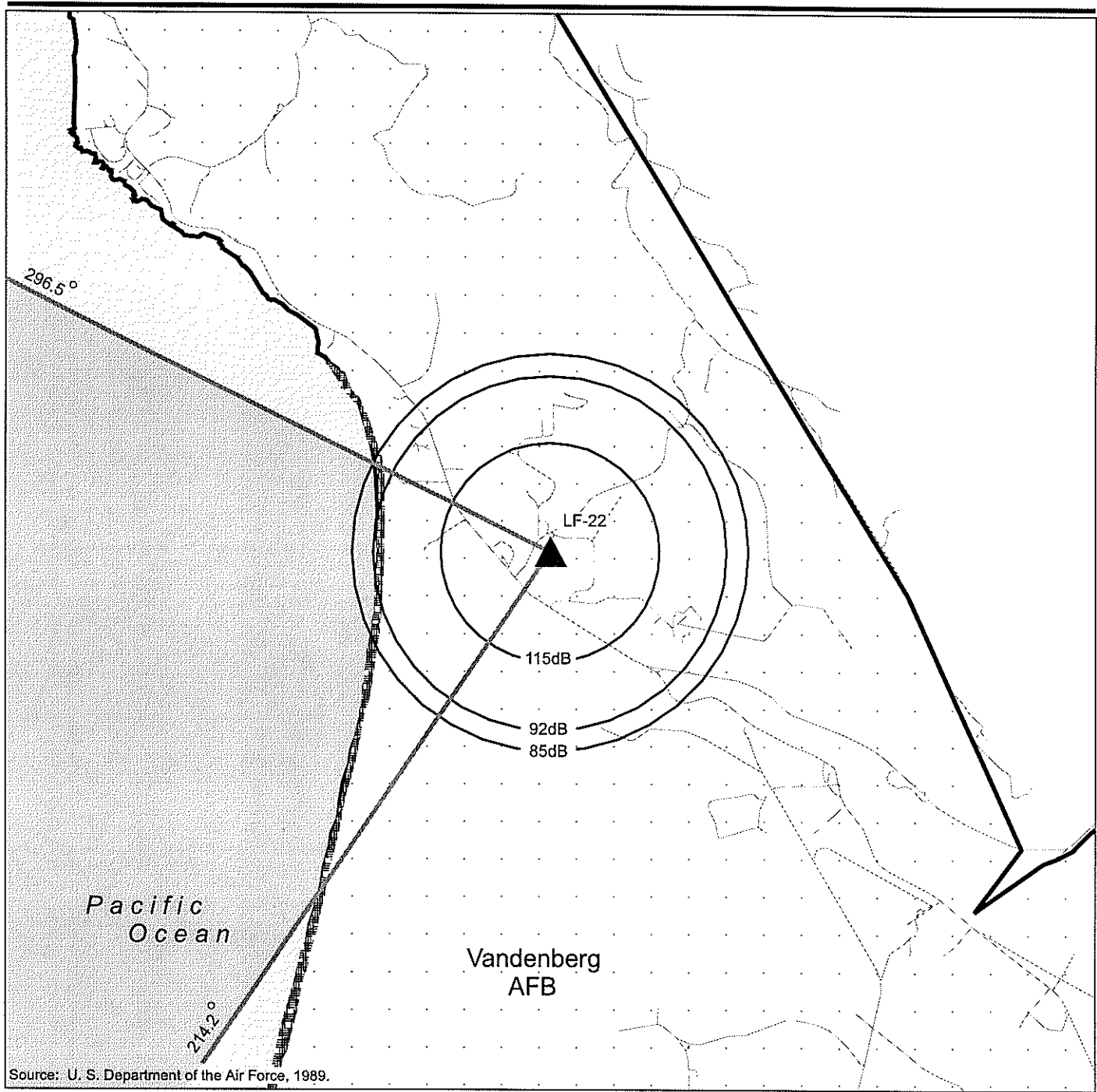
NORTH

Scale  
0 .4 .8 Miles  
0 .7 1.3 Kilometers

Group B, Vandenberg AFB

**Figure A-6**





#### EXPLANATION



Nesting Location of  
California Least Tern/  
Western Snowy Plover



Noise Contours



Launch Trajectory  
Azimuth



Candidate Launch Site

**Maximum Noise Levels  
for Single Launch of  
Lance Missile  
(dB re 20  $\mu$ Pa) at LF-22**

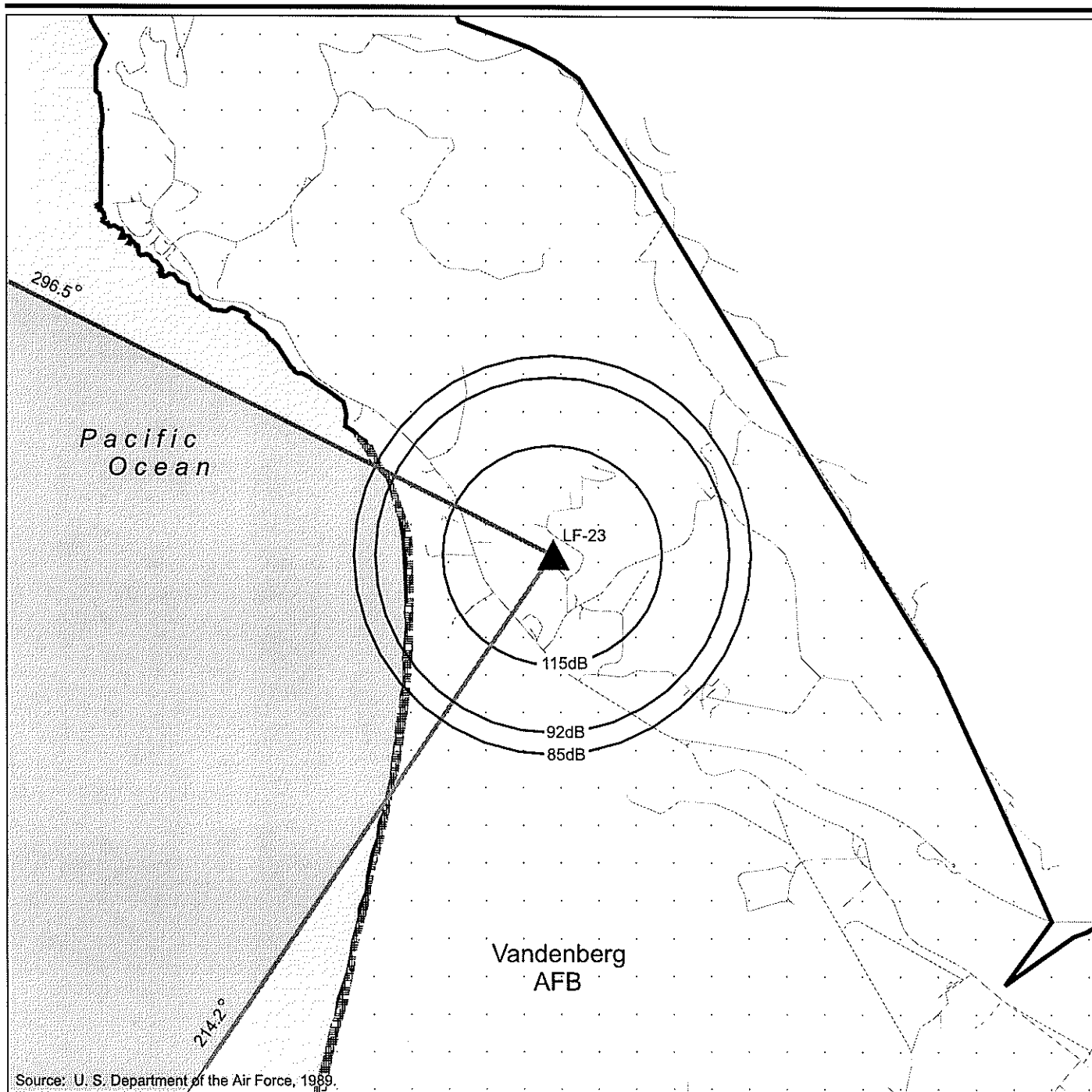


NORTH

Scale  
0 .4 .8 Miles  
0 .7 1.3 Kilometers

Group B, Vandenberg AFB

**Figure A-7**



#### EXPLANATION



Nesting Location of  
California Least Tern/  
Western Snowy Plover



Launch Trajectory  
Azimuth



Noise Contours

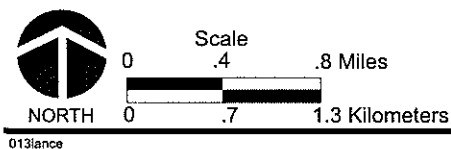


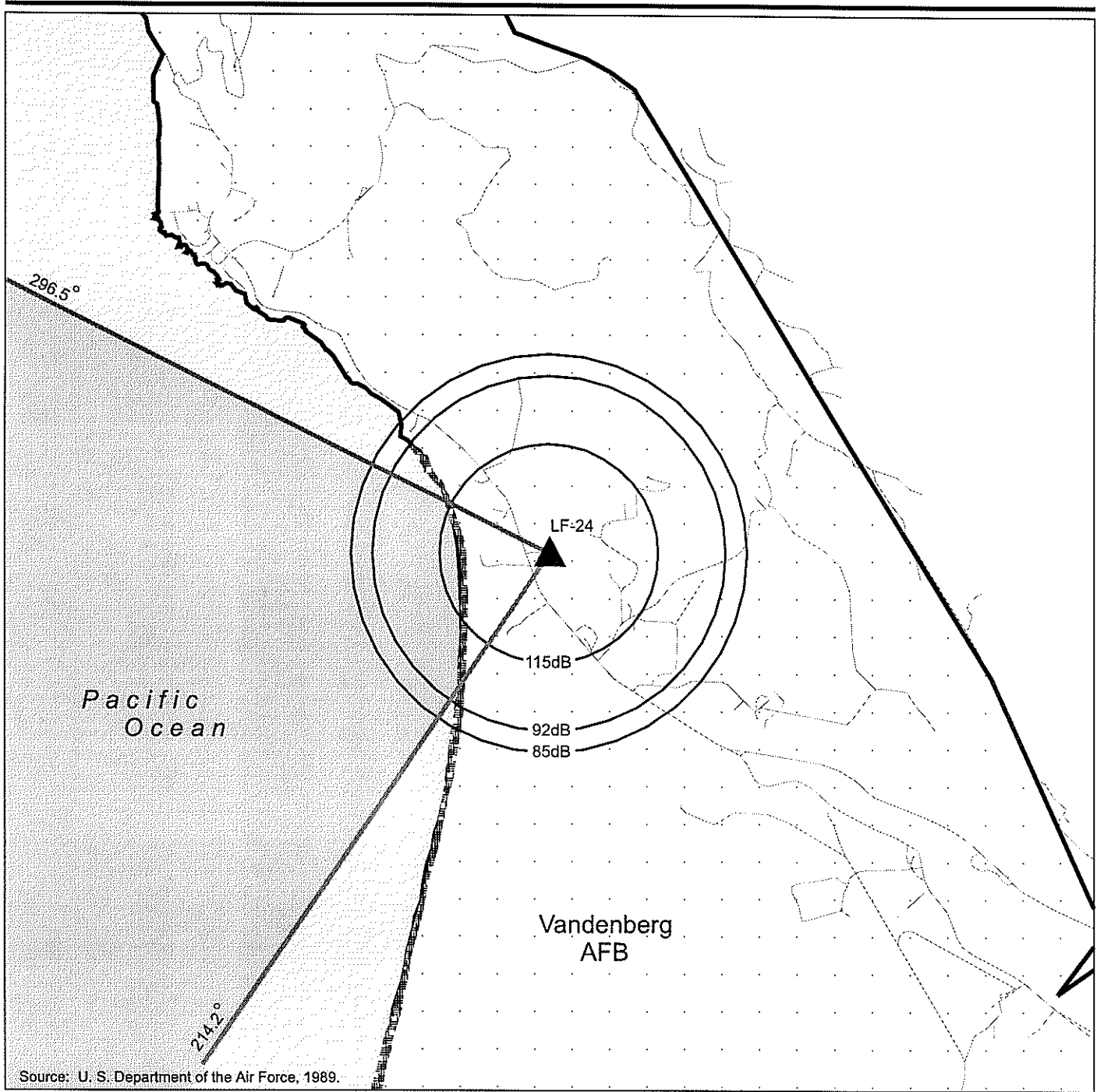
Candidate Launch Site

**Maximum Noise Levels  
for Single Launch of  
Lance Missile  
(dB re 20  $\mu$ Pa) at LF-23**





Group B, Vandenberg AFB

**Figure A-8**





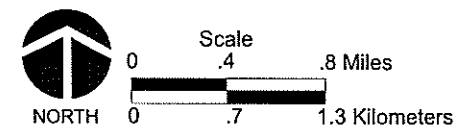
#### EXPLANATION

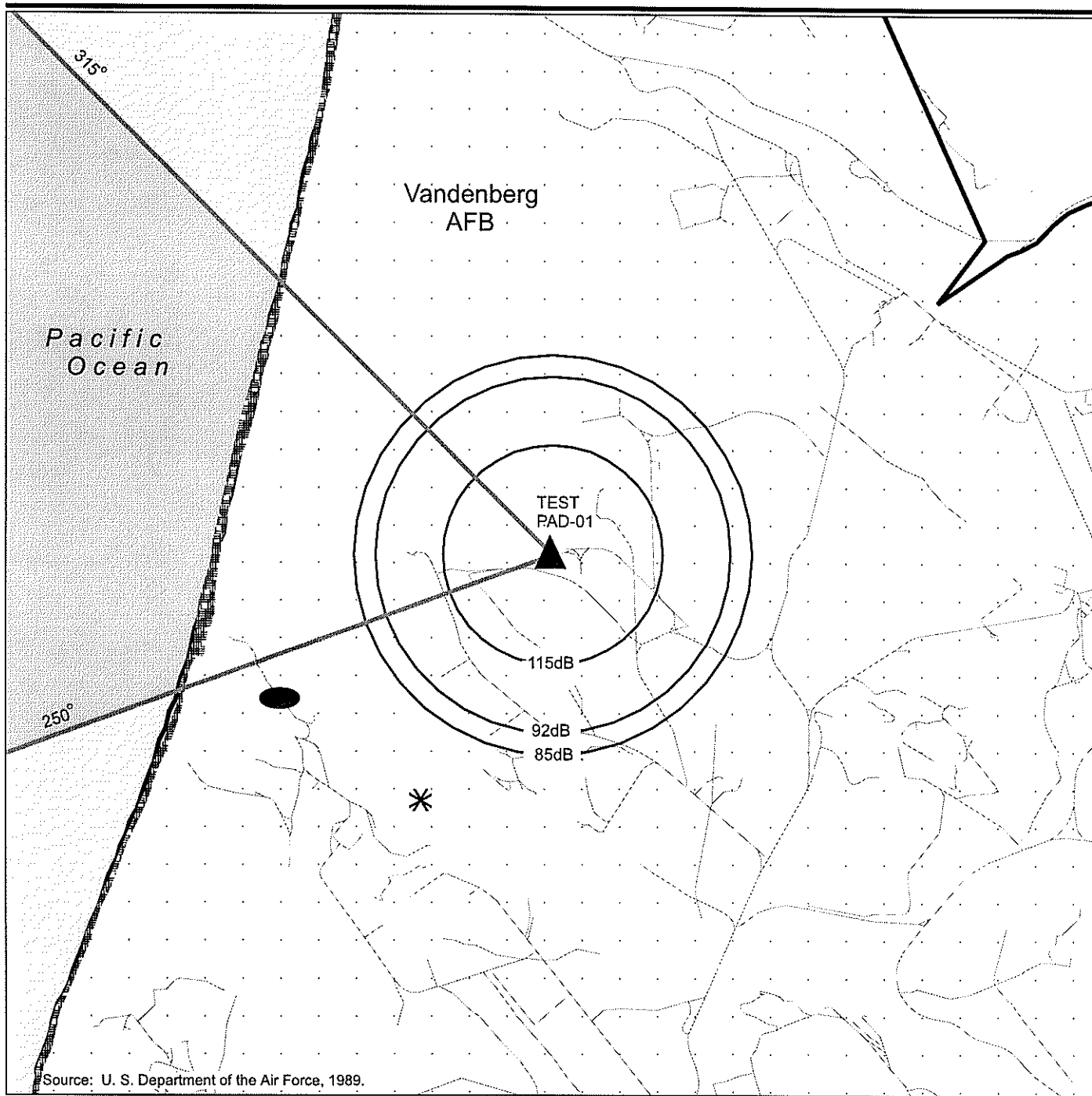
- |   |  |   |                       |
|---|--|---|-----------------------|
|  | Nesting Location of California Least Tern/<br>Western Snowy Plover |  | Noise Contours        |
|  | Launch Trajectory Azimuth  |  | Candidate Launch Site |

**Maximum Noise Levels  
for Single Launch of  
Lance Missile  
(dB re 20  $\mu$ Pa) at LF-24**

Group B, Vandenberg AFB

**Figure A-9**





#### EXPLANATION



Nesting Location of  
California Least Tern/  
Western Snowy Plover



Launch Trajectory  
Azimuth



Unarmored Threespine  
Stickleback



NORTH

Scale  
0 .4 .8 Miles  
0 .7 1.3 Kilometers



Noise Contours



Candidate Launch Site

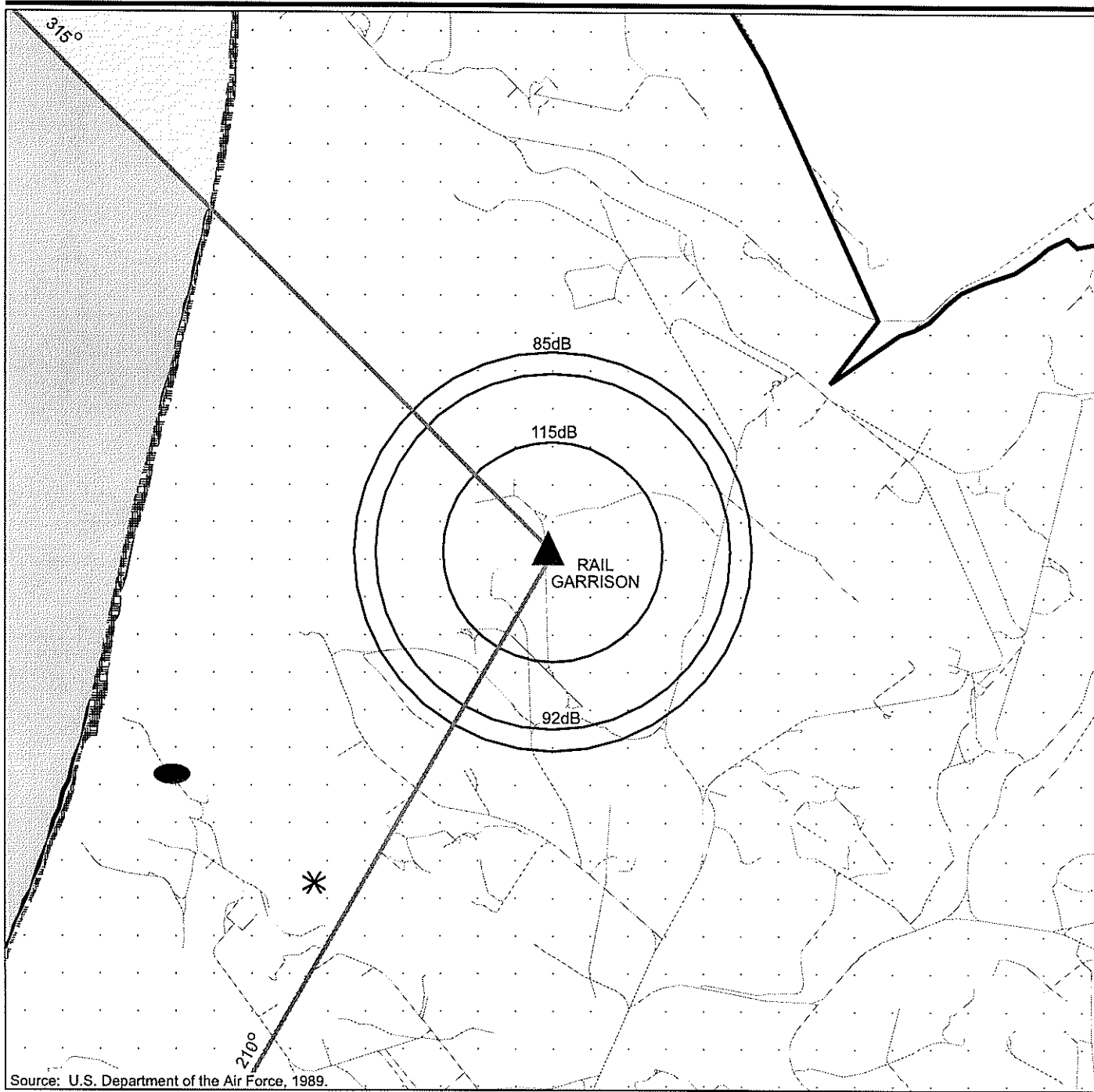


Tidewater Goby

**Maximum Noise Levels  
for Single Launch of  
Lance Missile  
(dB re 20  $\mu$ Pa) at  
Test Pad-01**







Group C, Vandenberg AFB

**Figure A-10**



Source: U.S. Department of the Air Force, 1989.

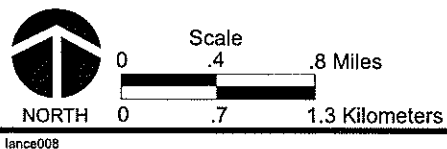
#### EXPLANATION

- |   |  |   |                       |
|---|--|---|-----------------------|
|  | Nesting Location of California Least Tern/<br>Western Snowy Plover |  | Noise Contours        |
|  | Launch Trajectory<br>Azimuth                                       |  | Candidate Launch Site |
|  | Unarmored Threespine<br>Stickleback                                |  | Tidewater Goby        |

### Maximum Noise Levels for Single Launch of Lance Missile (dB re 20 $\mu$ Pa) at the Rail Garrison Site

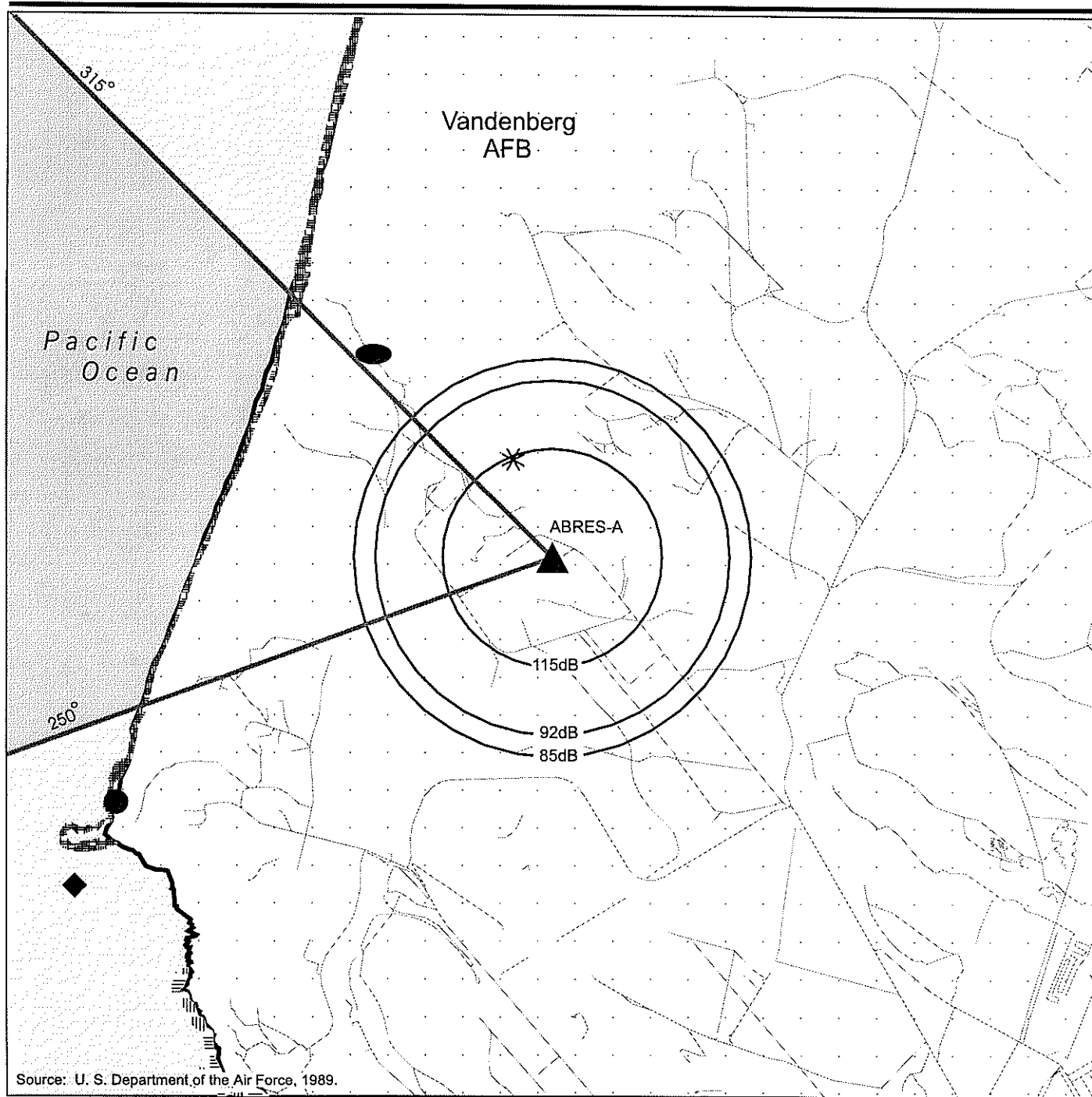
Group C, Vandenberg AFB

Figure A-11










lance008

TBM Targets EA



#### EXPLANATION

- |   |  |   |   |
|---|--|---|---|
|  | Nesting Location of California Least Tern/<br>Western Snowy Plover                     |  | Noise Contours                                |
|  | Haulout Location of California Sea Lion,<br>Northern Elephant Seal,<br>and Harbor Seal |  | Candidate Launch Site                         |
|  | Launch Trajectory Azimuth  |  | Roosting Location of California Brown Pelican |
|   |  |  | Sea Otters                                    |



Scale  
0 .4 .8 Miles  
0 .7 1.3 Kilometers

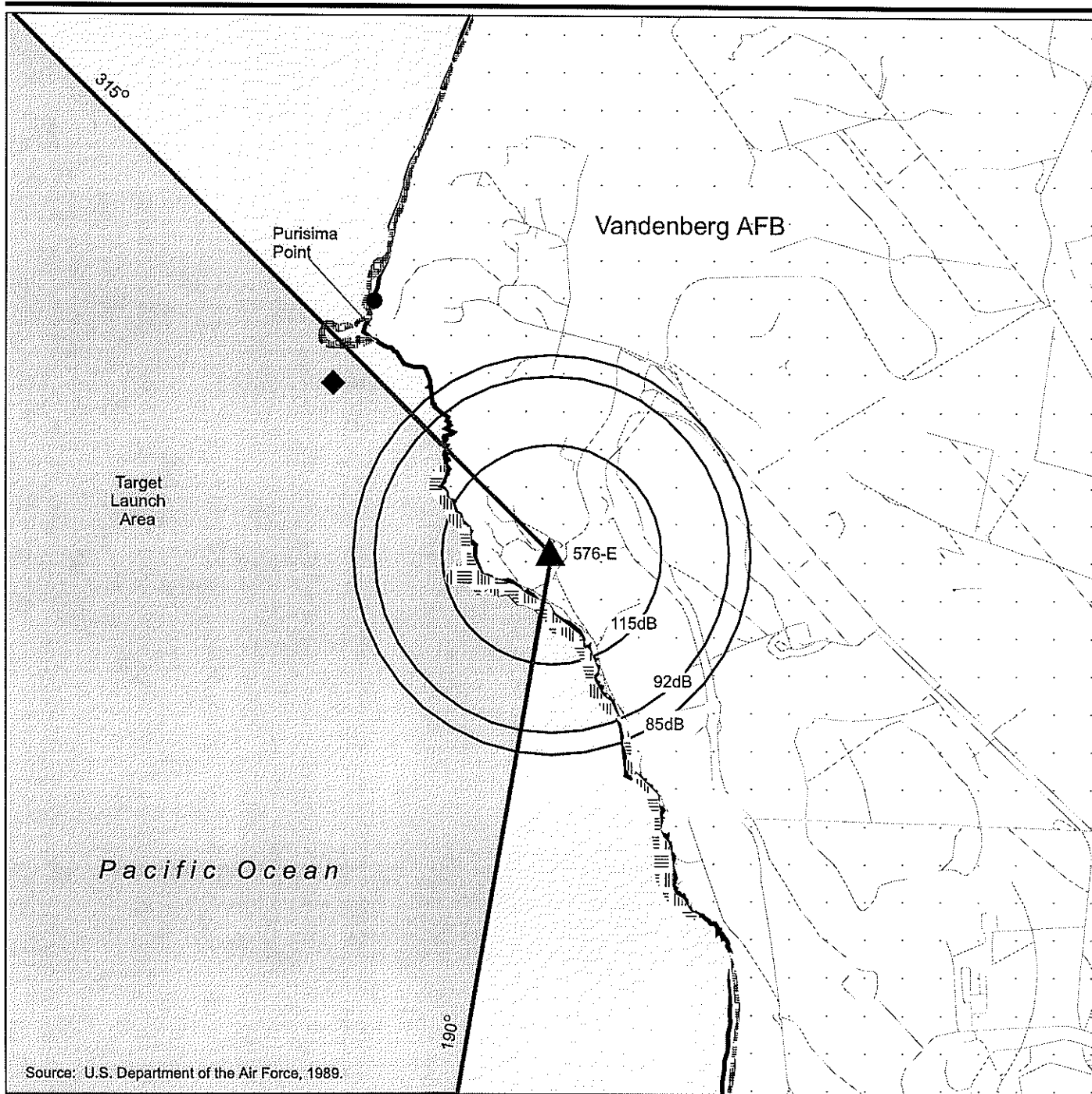
lance014

#### Maximum Noise Levels for Single Launch of Lance Missile (dB re 20 $\mu$ Pa) at the ABRES A Sites

Group C, Vandenberg AFB

Figure A-12

TBM Targets EA



#### EXPLANATION



Nesting Location of  
California Least Tern/  
Western Snowy Plover



Haulout Location of  
California Sea Lion,  
Northern Elephant Seal,  
and Harbor Seal



Launch Trajectory  
Azimuth



NORTH

Scale  
0 .4 .8 Miles  
0 .7 1.3 Kilometers



Noise Contours



Candidate Launch Site



Roosting Location of  
California Brown Pelican

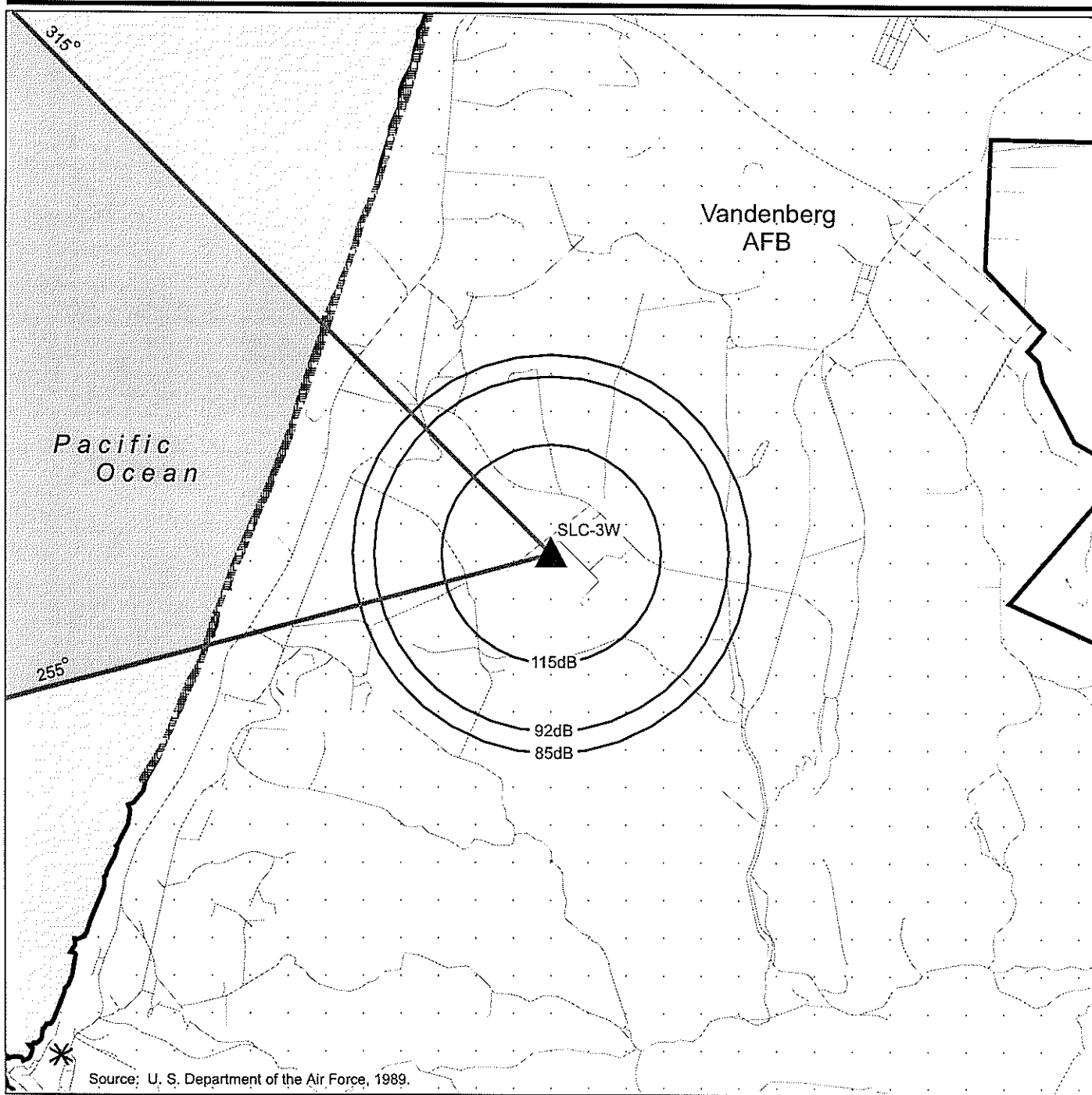


Sea Otters

**Maximum Noise Levels  
for Single Launch of  
Lance Missile  
(dB re 20  $\mu$ Pa) at 576-E**

Group C, Vandenberg AFB

**Figure A-13**



#### EXPLANATION



Nesting Location of  
California Least Tern/  
Western Snowy Plover



Noise Contours



Launch Trajectory  
Azimuth



Candidate Launch Site



Unarmored Threespine  
Stickleback



NORTH

Scale

0 .4 .8 Miles

0 .7 1.3 Kilometers

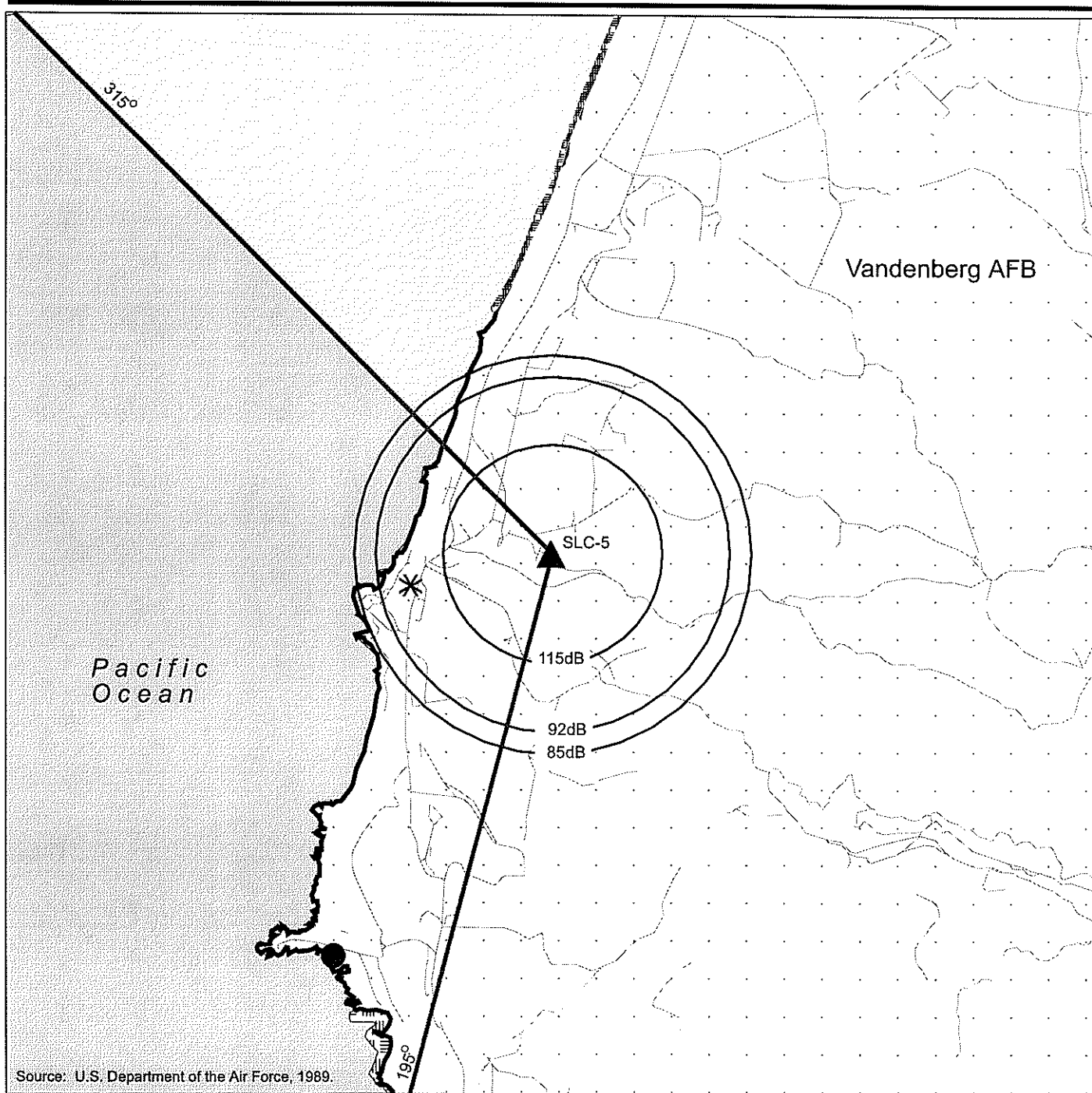
**Maximum Noise Levels  
for Single Launch of  
Lance Missile  
(dB re 20  $\mu$ Pa)  
at SLC-3W**

Group D, Vandenberg AFB








**Figure A-14**

lance022





## EXPLANATION

- |   |  |   |  |
|---|--|---|--|
|  | Nesting Location of California Least Tern/<br>Western Snowy Plover                     |  | Noise Contours                                   |
|  | Haulout Location of California Sea Lion,<br>Northern Elephant Seal,<br>and Harbor Seal |  | Candidate Launch Site                            |
|  | Launch Trajectory<br>Azimuth   |  | Roosting Location of<br>California Brown Pelican |
|   |  |  | Unarmored Threespine<br>Stickleback              |



Scale  
0 .4 .8 Miles  
0 .7 1.3 Kilometers

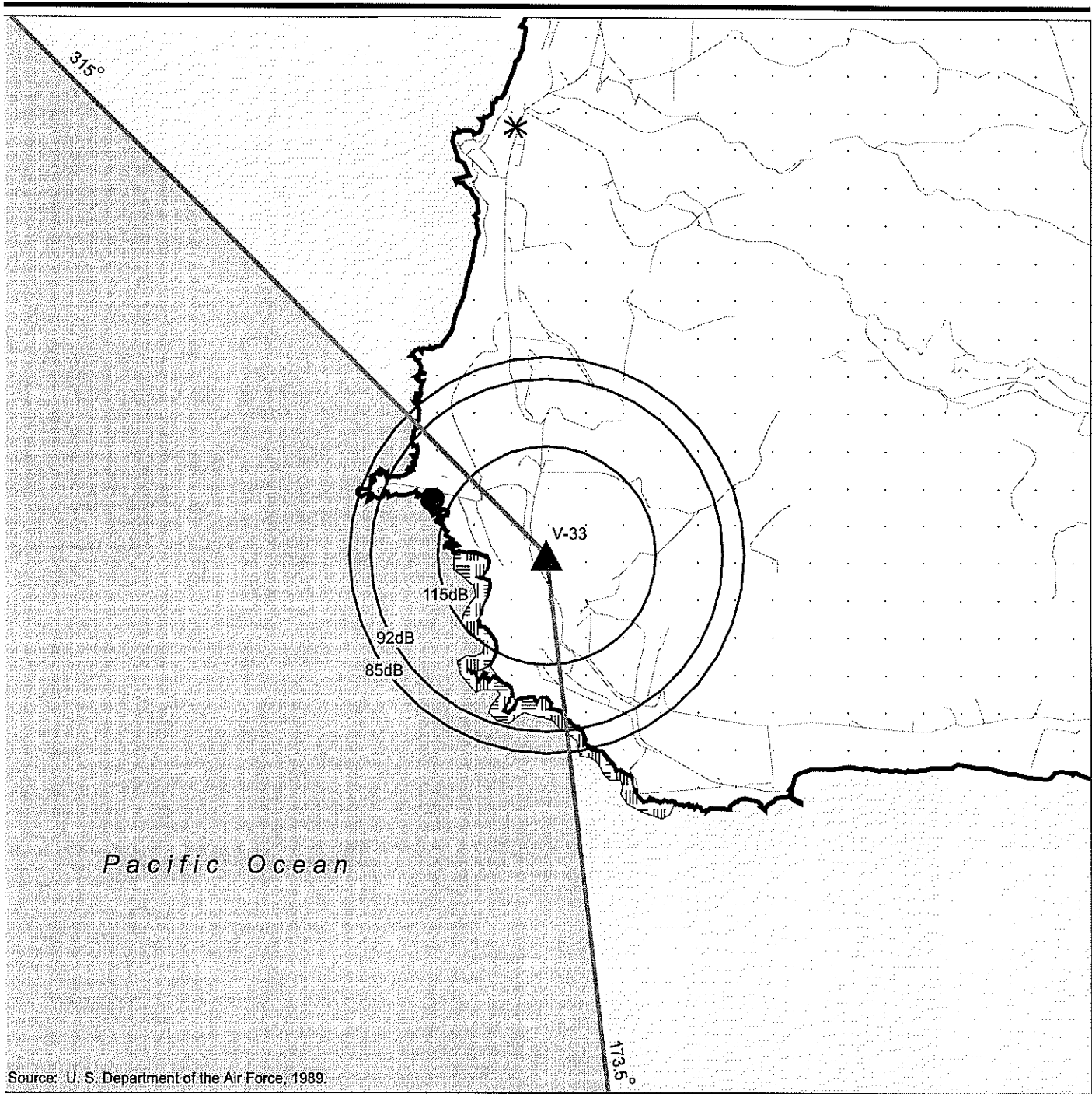
lance017

TBM Targets EA








## Maximum Noise Levels for Single Launch of Lance Missile (dB re 20 $\mu$ Pa) at SLC-5

Group D, Vandenberg AFB

Figure A-15



#### EXPLANATION

-  Haulout Location of California Sea Lion, Northern Elephant Seal, and Harbor Seal
-  Launch Trajectory Azimuth
-  Unarmored Threespine Stickleback
-  NORTH
-  Noise Contours
-  Candidate Launch Site
-  Roosting Location of California Brown Pelican

Scale

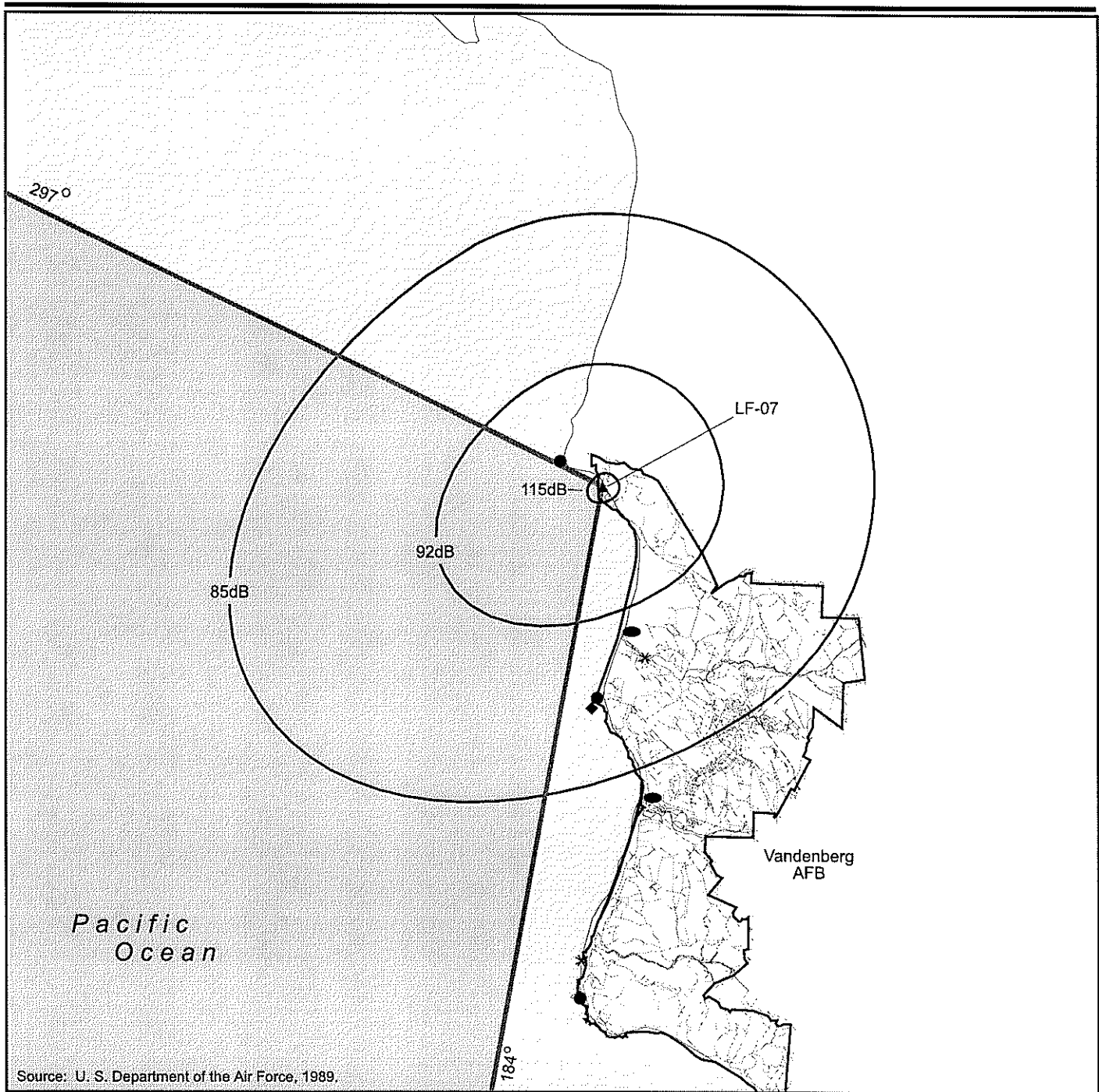
0 .4 .8 Miles

0 .7 1.3 Kilometers

#### Maximum Noise Levels for Single Launch of Lance Missile (dB re 20 $\mu$ Pa) at V-33

Group E, Vandenberg AFB

Figure A-16



#### EXPLANATION

- |  |                           |  |   |
|--|---------------------------|--|---|
|  | Launch Trajectory Azimuth |  | Tidewater Goby                                |
|  | Noise Contours            |  | Sea Otters                                    |
|  | Candidate Launch Site     |  | Roosting Location of California Brown Pelican |
|  |                           |  | Unarmored Threespined Stickleback             |

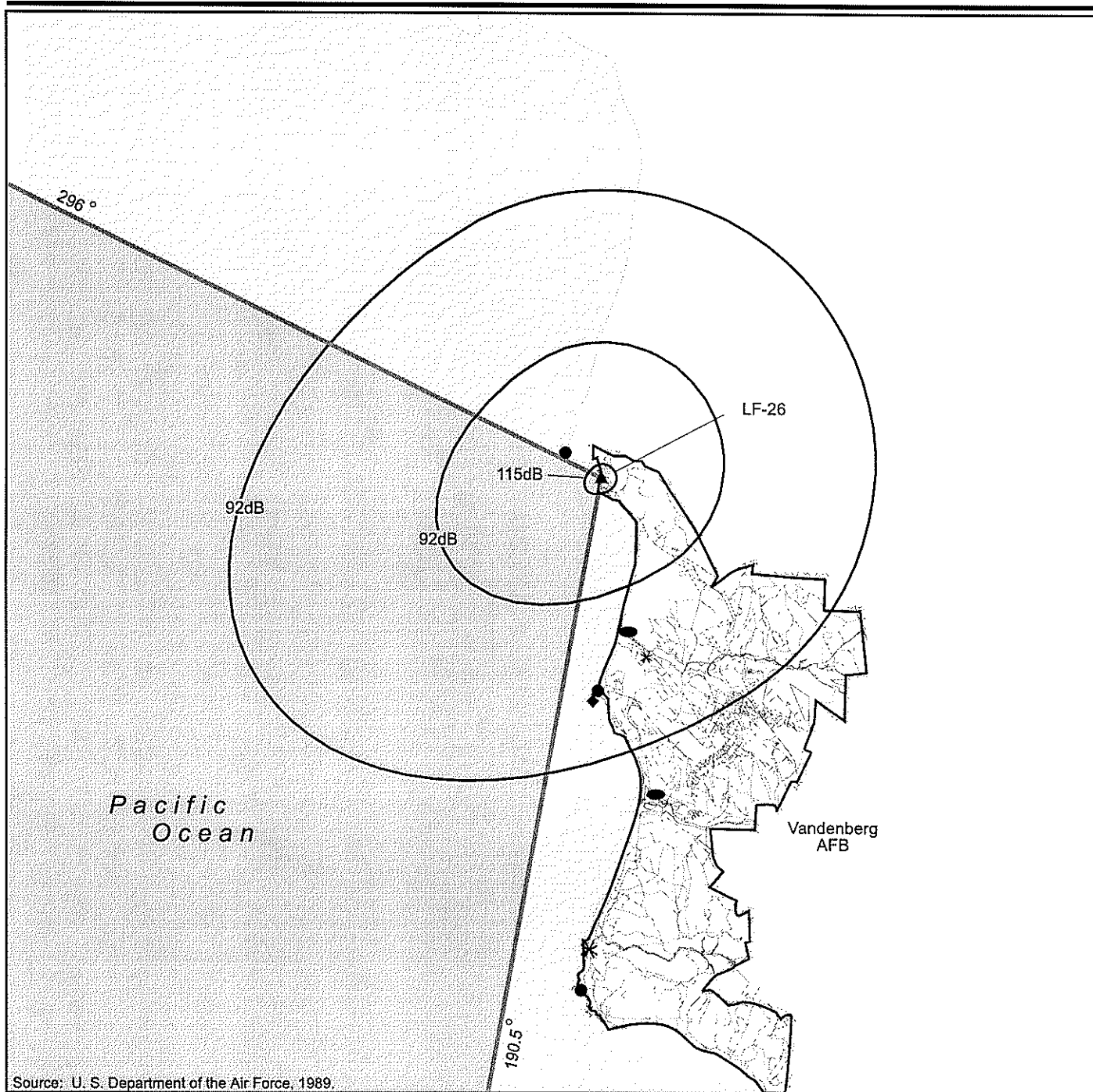


Scale  
0 3.2 6.3 Miles  
0 5.1 10.2 Kilometers

#### Maximum Noise Levels for Single Launch of PAAT Missile at LF-07

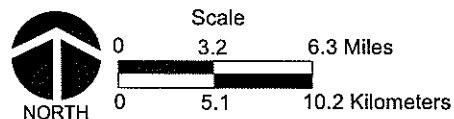
Group A, Vandenberg AFB

**Figure A-17**



#### EXPLANATION

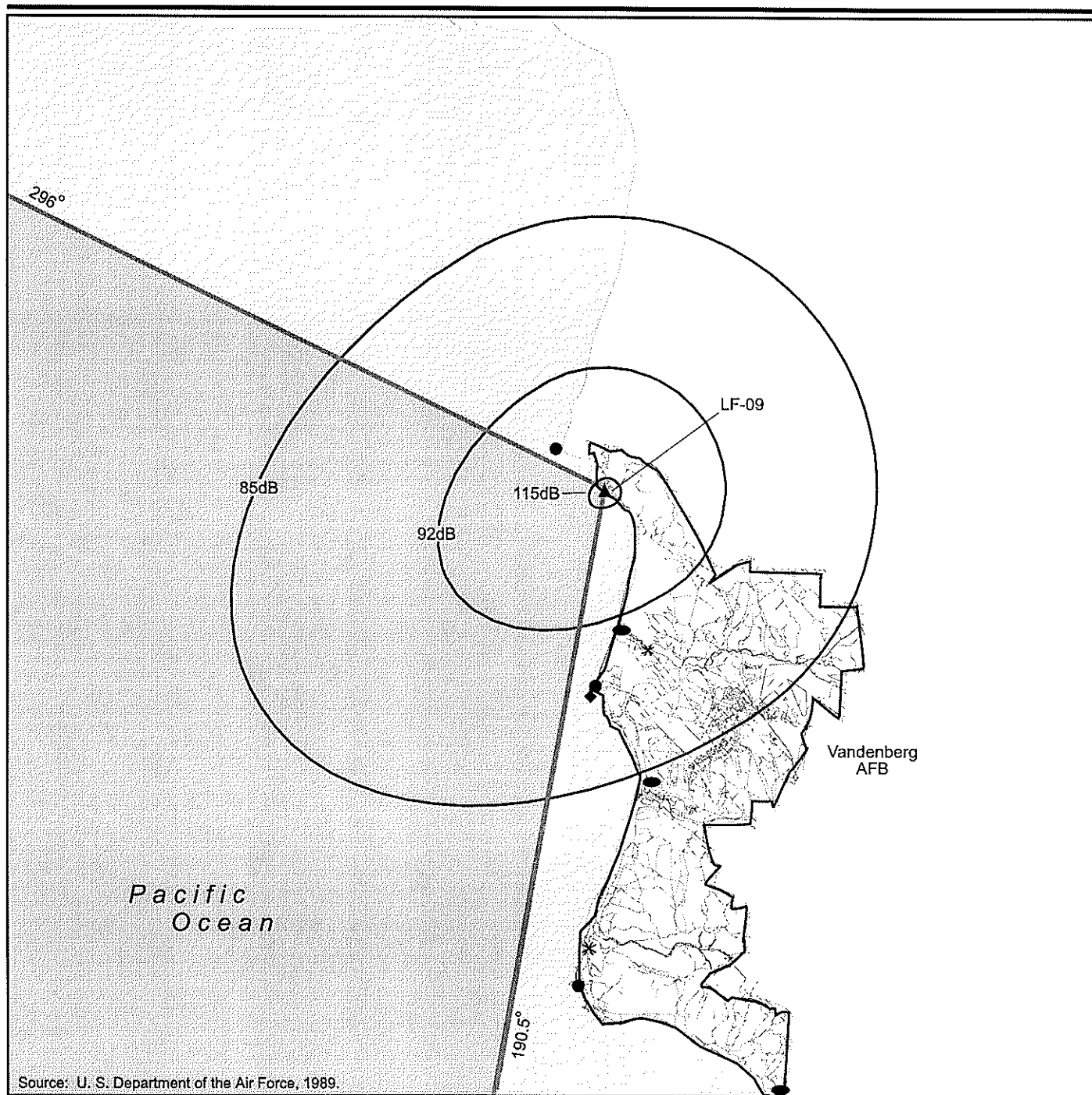
- |  |                           |  |   |
|--|---------------------------|--|---|
|  | Launch Trajectory Azimuth |  | Tidewater Goby                                |
|  | Noise Contours            |  | Sea Otters                                    |
|  | Candidate Launch Site     |  | Roosting Location of California Brown Pelican |
|  |                           |  | Unarmored Threespined Stickleback             |



#### Maximum Noise Levels for Single Launch of PAAT Missile at LF-26

Group A, Vandenberg AFB

**Figure A-18**



#### EXPLANATION

Launch Trajectory Azimuth

Noise Contours

Candidate Launch Site

Tidewater Goby

Sea Otters

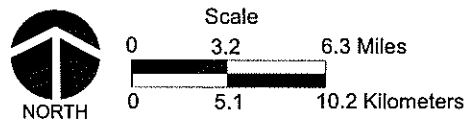
Roosting Location of California Brown Pelican

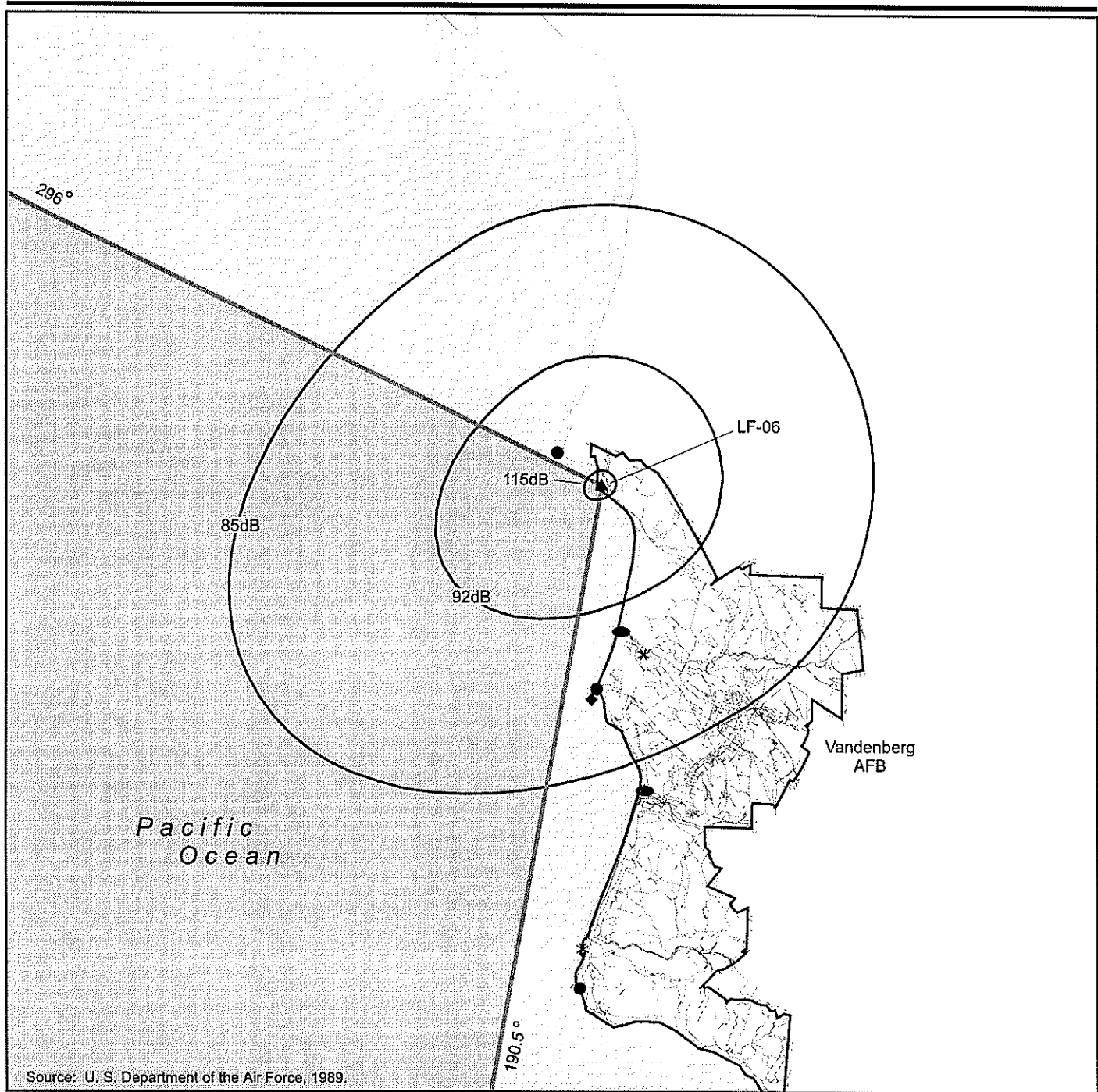
Unarmored Threespined Stickleback

### Maximum Noise Levels for Single Launch of PAAT Missile at LF-09

Group A, Vandenberg AFB

**Figure A-19**





# EXPLANATION

- |  |                           |  |   |
|--|---------------------------|--|---|
|  | Launch Trajectory Azimuth |  | Tidewater Goby                                |
|  | Noise Contours            |  | Sea Otters                                    |
|  | Candidate Launch Site     |  | Roosting Location of California Brown Pelican |
|  |                           |  | Unarmored Threespined Stickleback             |

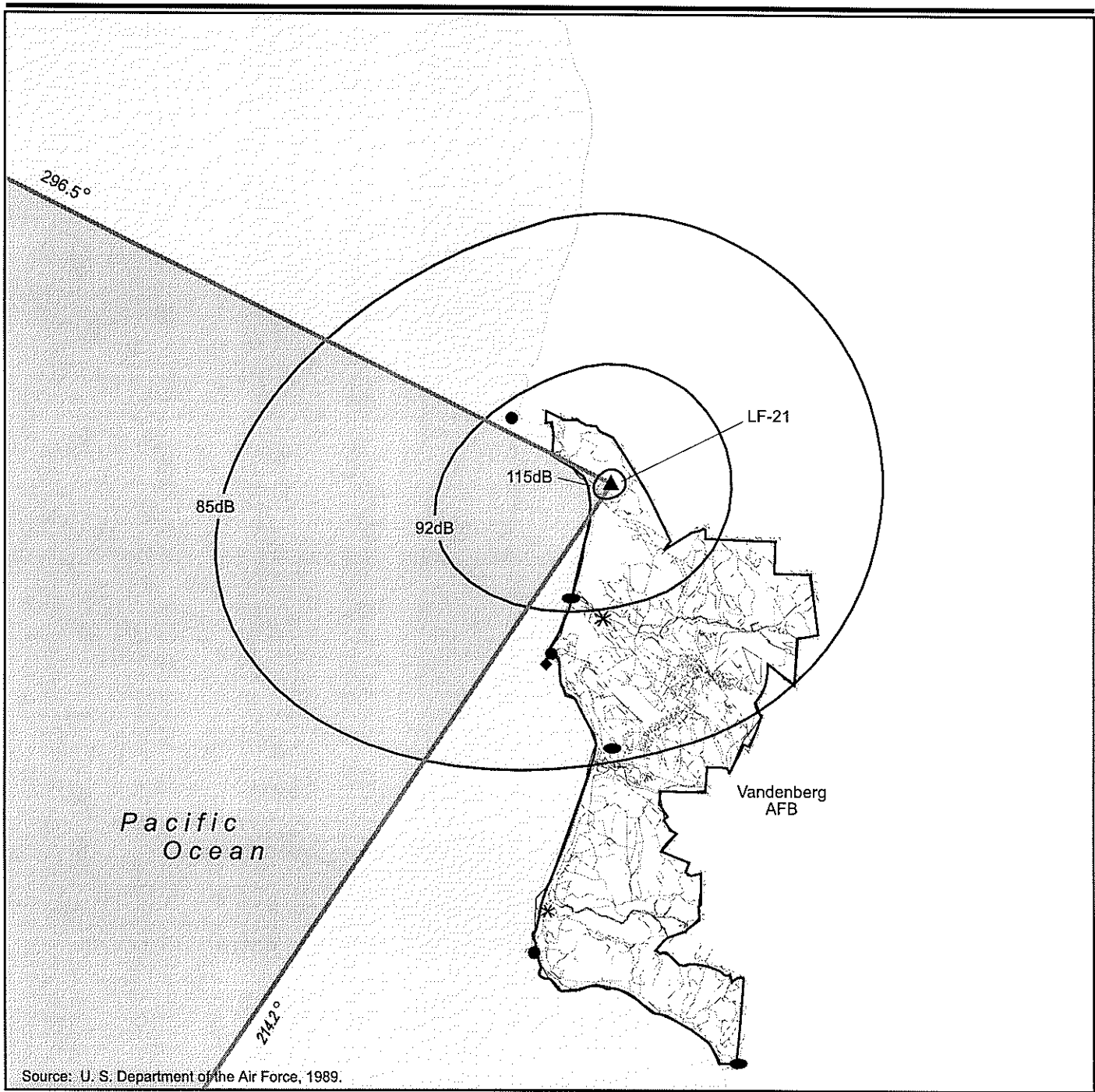


Scale  
0 3.2 6.3 Miles  
0 5.1 10.2 Kilometers

## Maximum Noise Levels for Single Launch of PAAT Vehicle at LF-06

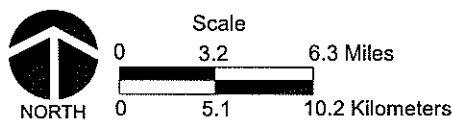
Group A, Vandenberg AFB

Figure A-20



# EXPLANATION

- |  |                           |  |   |
|--|---------------------------|--|---|
|  | Launch Trajectory Azimuth |  | Tidewater Goby                                |
|  | Noise Contours            |  | Sea Otters                                    |
|  | Candidate Launch Site     |  | Roosting Location of California Brown Pelican |
|  |                           |  | Unarmored Threespined Stickleback             |

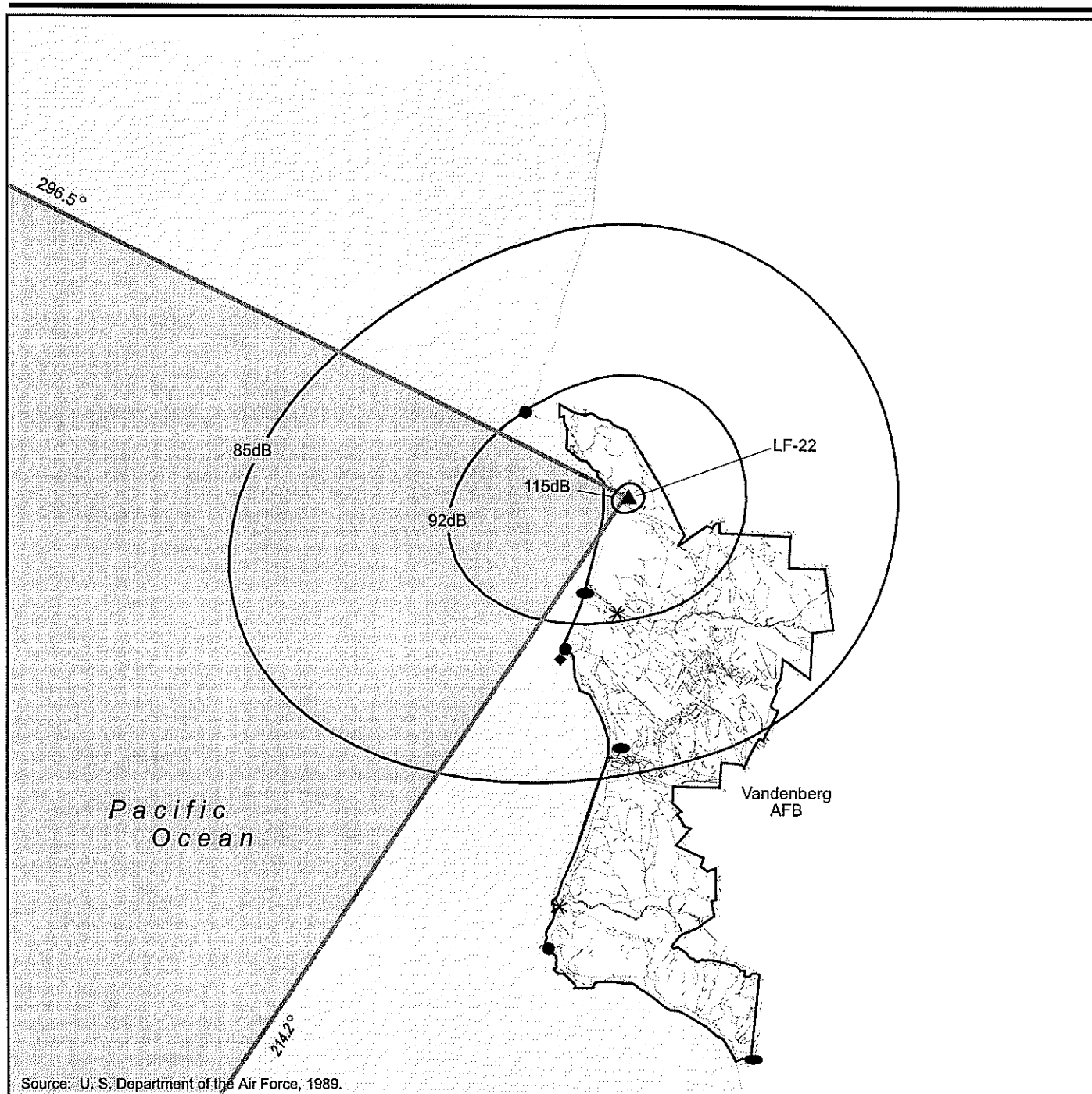


## Maximum Noise Levels for Single Launch of PAAT Missile at LF-21

Group B, Vandenberg AFB

Figure A-21





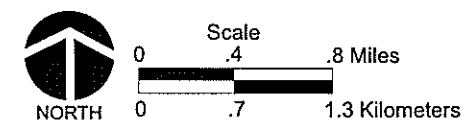
#### EXPLANATION

- |  |                           |  |   |
|--|---------------------------|--|---|
|  | Launch Trajectory Azimuth |  | Tidewater Goby                                |
|  | Noise Contours            |  | Sea Otters                                    |
|  | Candidate Launch Site     |  | Roosting Location of California Brown Pelican |
|  |                           |  | Unarmored Threespined Stickleback             |

#### Maximum Noise Levels for Single Launch of PAAT Missile at LF-22

Group B, Vandenberg AFB

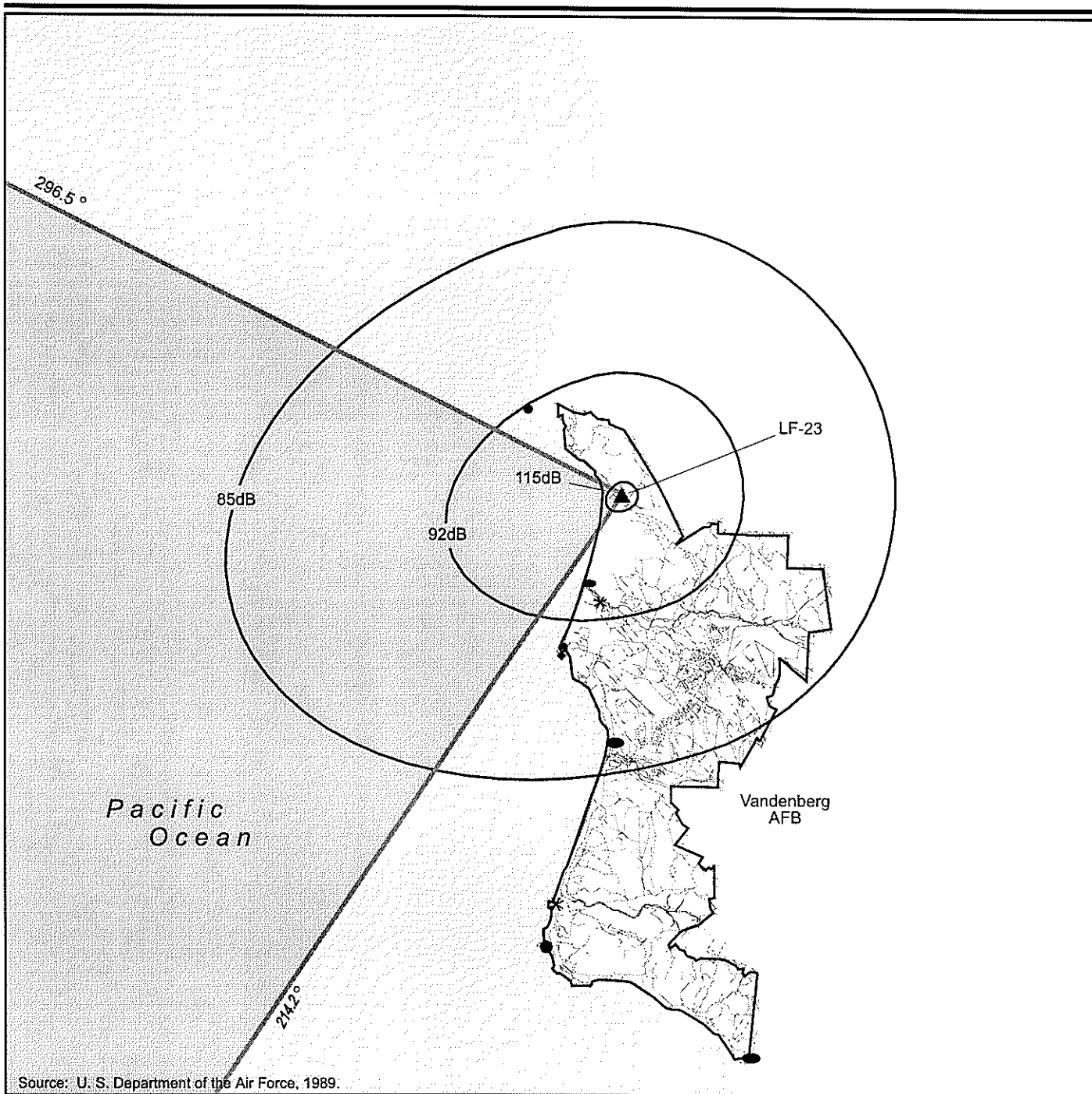
Figure A-22



lance067

TBM Targets EA





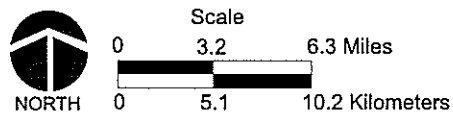
#### EXPLANATION

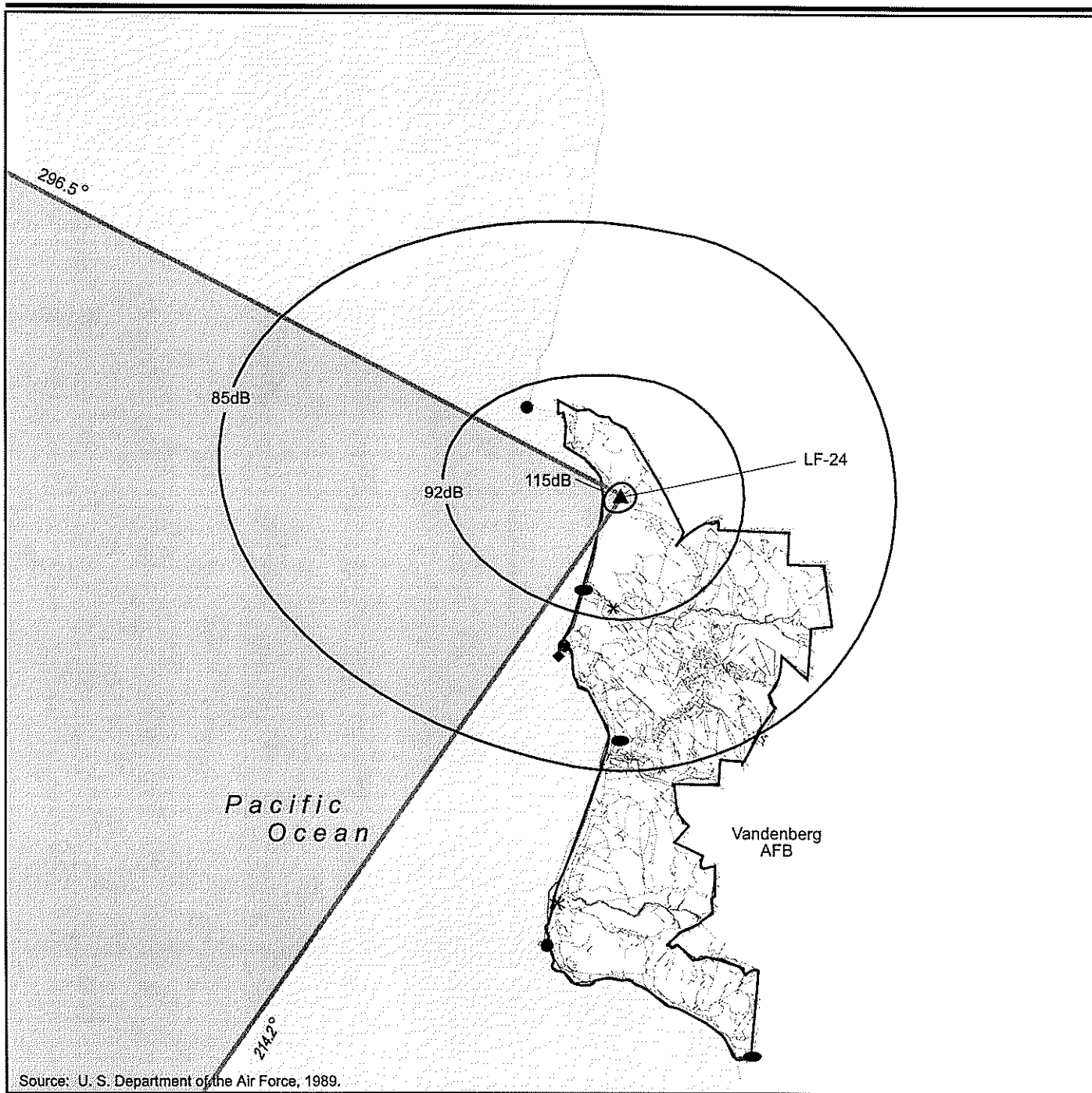
- |  |                           |  |   |
|--|---------------------------|--|---|
|  | Launch Trajectory Azimuth |  | Tidewater Goby                                |
|  | Noise Contours            |  | Sea Otters                                    |
|  | Candidate Launch Site     |  | Roosting Location of California Brown Pelican |
|  |                           |  | Unarmored Threespined Stickleback             |

#### Maximum Noise Levels for Single Launch of PAAT Missile at LF-23

Group B, Vandenberg AFB

Figure A-23





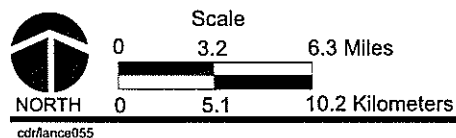
#### EXPLANATION

- |  |                           |  |   |
|--|---------------------------|--|---|
|  | Launch Trajectory Azimuth |  | Tidewater Goby                                |
|  | Noise Contours            |  | Sea Otters                                    |
|  | Candidate Launch Site     |  | Roosting Location of California Brown Pelican |
|  |                           |  | Unarmored Threespined Stickleback             |

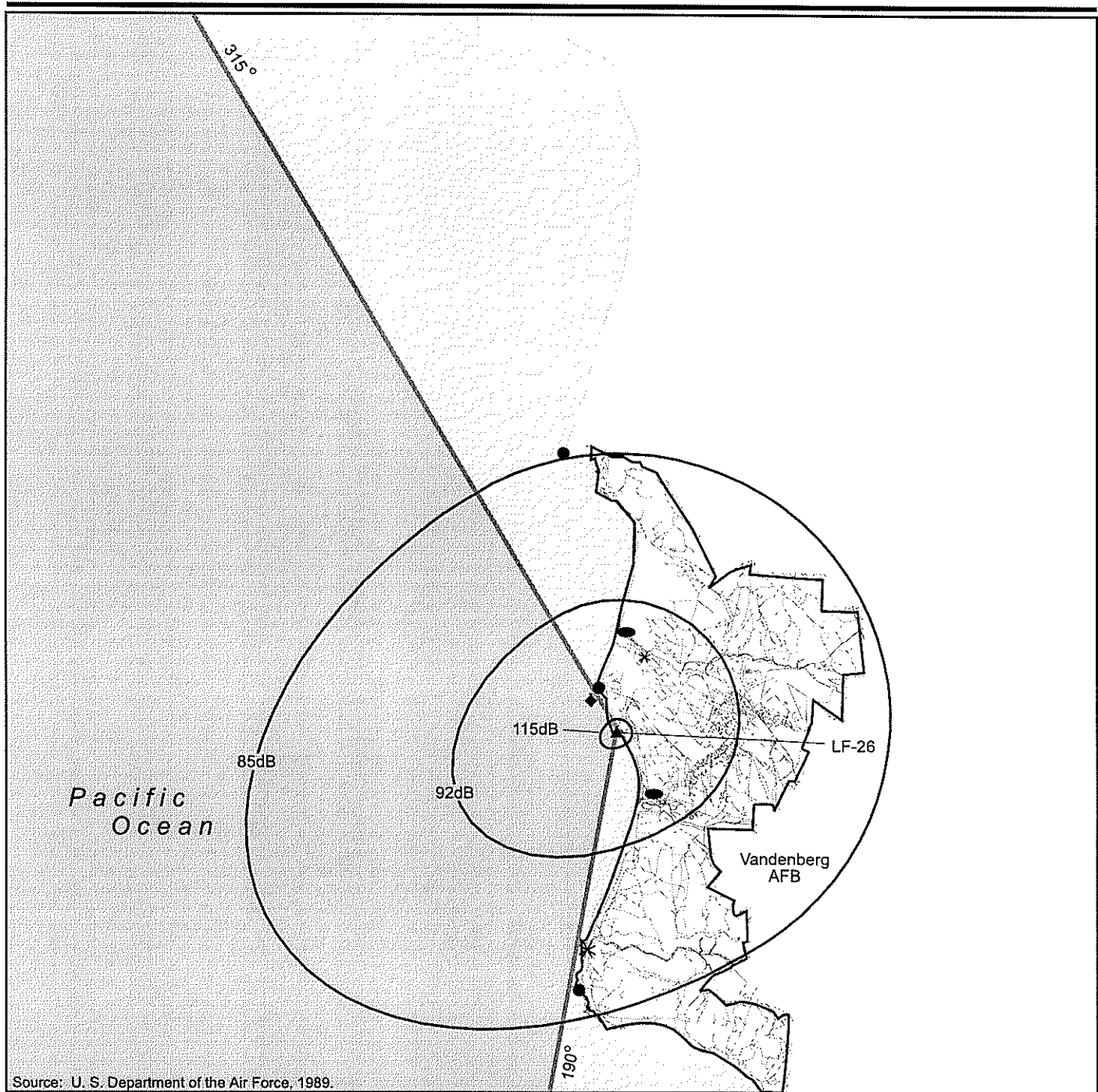
#### Maximum Noise Levels for Single Launch of PAAT Missile at LF-24

Group B, Vandenberg AFB

**Figure A-24**

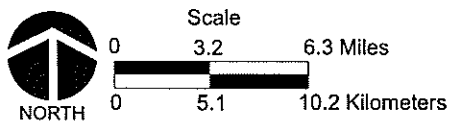


TBM Targets EA



#### EXPLANATION

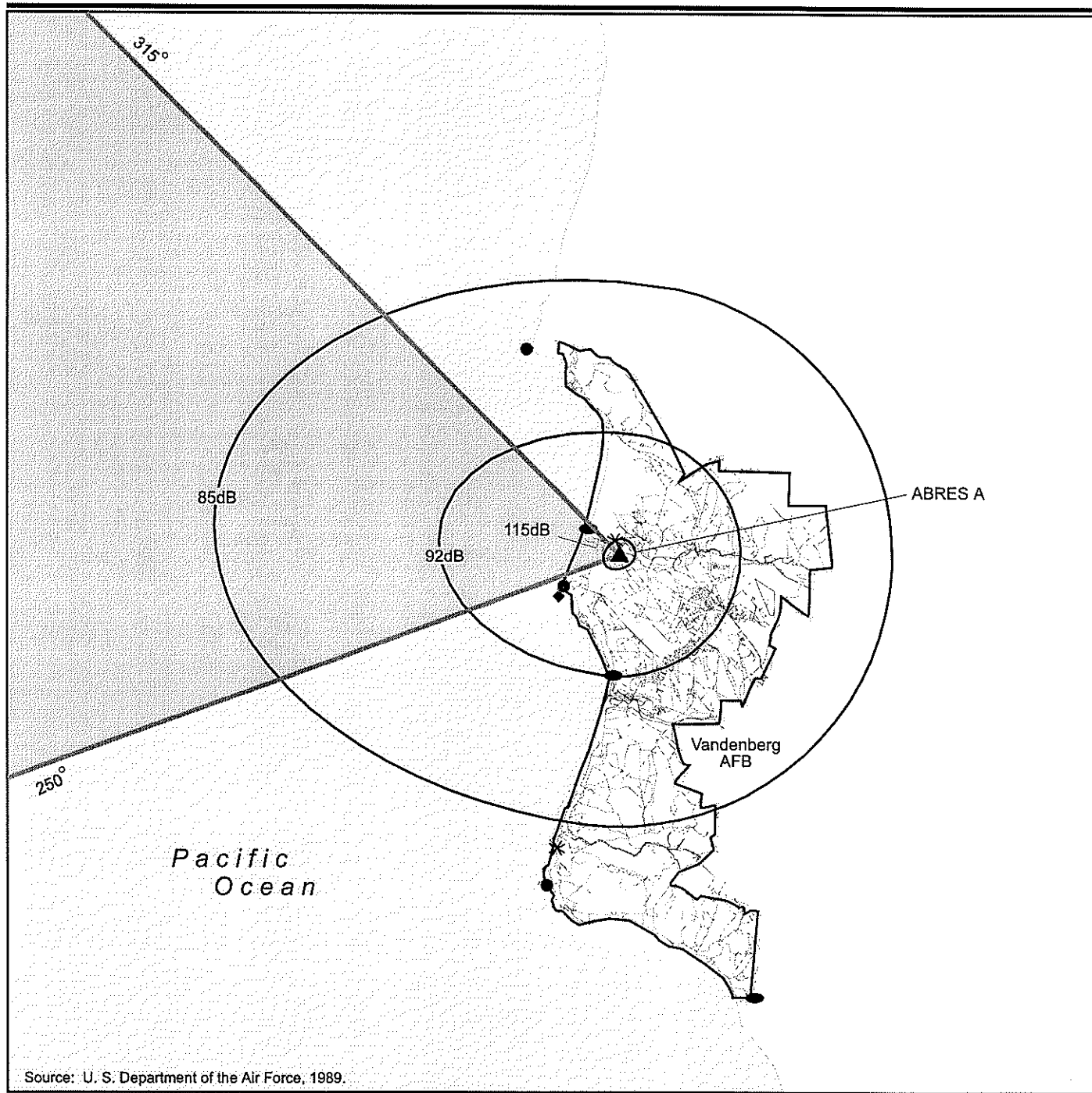
- |  |                           |  |   |
|--|---------------------------|--|---|
|  | Launch Trajectory Azimuth |  | Tidewater Goby                                |
|  | Noise Contours            |  | Sea Otters                                    |
|  | Candidate Launch Site     |  | Roosting Location of California Brown Pelican |
|  |                           |  | Unarmored Threespined Stickleback             |



#### Maximum Noise Levels for Single Launch of PAAT Missile at 576-E

Group C, Vandenberg AFB

**Figure A-25**



#### EXPLANATION



Launch Trajectory  
Azimuth



Noise Contours



Candidate Launch Site



NORTH

Scale

0 3.2 6.3 Miles  
0 5.1 10.2 Kilometers



Tidewater Goby



Sea Otters



Roosting Location of  
California Brown Pelican

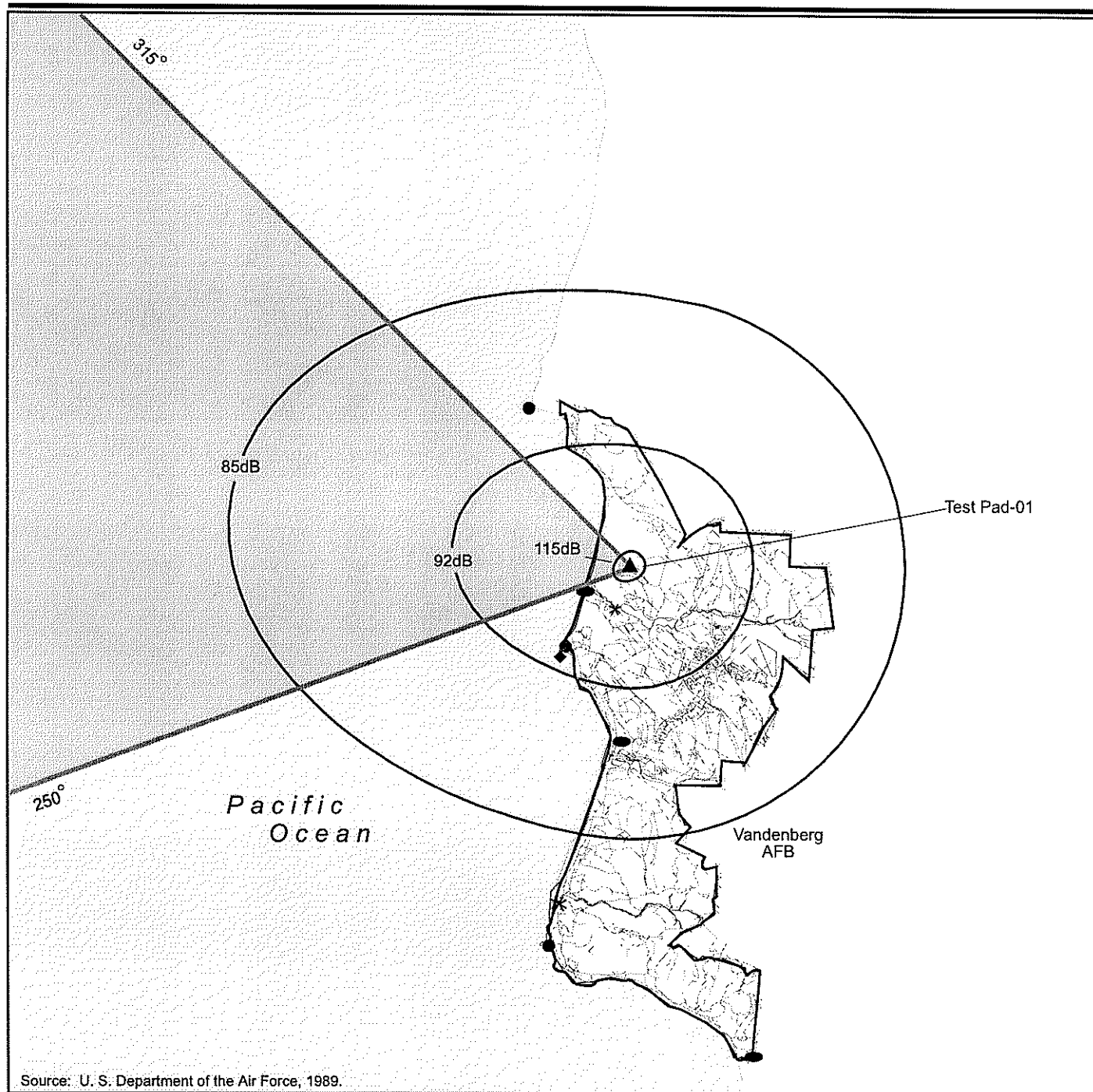


Unarmored Threespined  
Stickleback

### Maximum Noise Levels for Single Launch of PAAT Missile at ABRES A Sites

Group C, Vandenberg AFB

**Figure A-26**



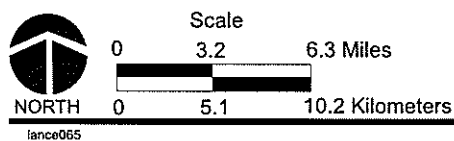
#### EXPLANATION

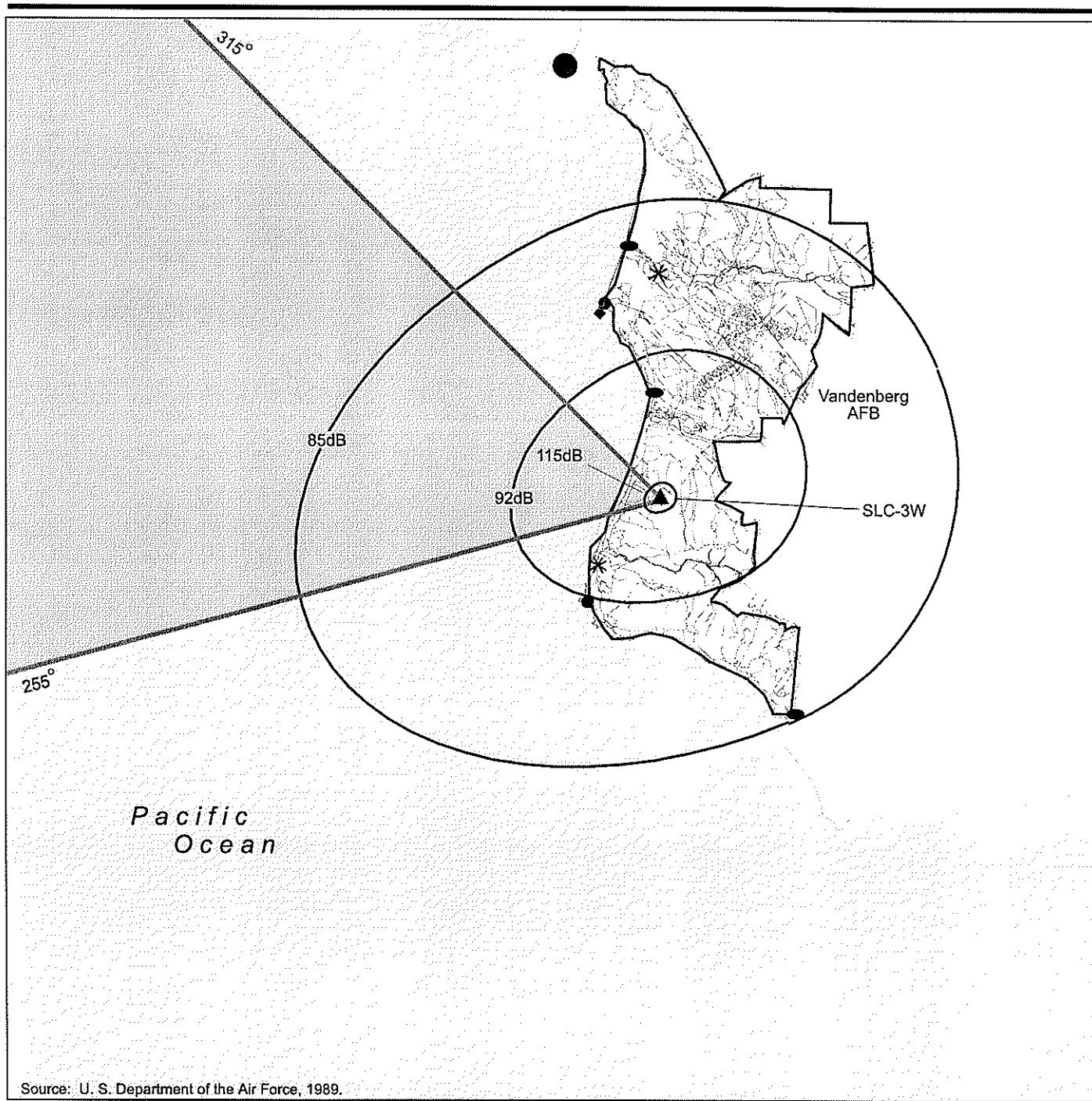
- |  |                           |  |   |
|--|---------------------------|--|---|
|  | Launch Trajectory Azimuth |  | Tidewater Goby                                |
|  | Noise Contours            |  | Sea Otters                                    |
|  | Candidate Launch Site     |  | Roosting Location of California Brown Pelican |
|  |                           |  | Unarmored Threespined Stickleback             |

### Maximum Noise Levels for Single Launch of PAAT Missile at Test Pad-01

Group C, Vandenberg AFB

**Figure A-27**





#### EXPLANATION

- |  |                           |  |   |
|--|---------------------------|--|---|
|  | Launch Trajectory Azimuth |  | Tidewater Goby                                |
|  | Noise Contours            |  | Sea Otters                                    |
|  | Candidate Launch Site     |  | Roosting Location of California Brown Pelican |
|  |                           |  | Unarmored Threespined Stickleback             |



NORTH

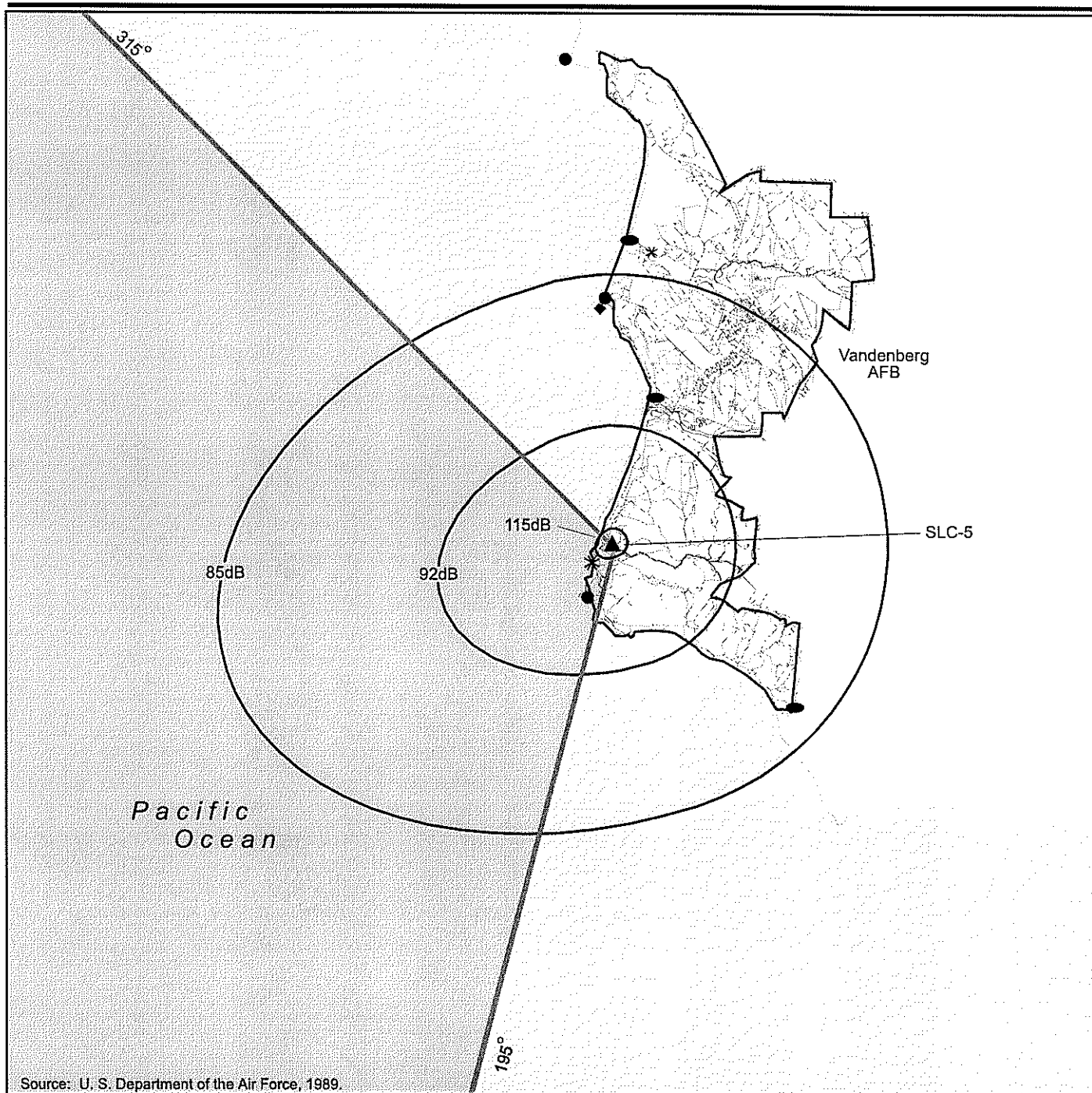
lance057

Scale  
0 3.2 6.3 Miles  
0 5.1 10.2 Kilometers

### Maximum Noise Levels for Single Launch of PAAT Missile at SLC-3W

Group D, Vandenberg AFB

Figure A-28

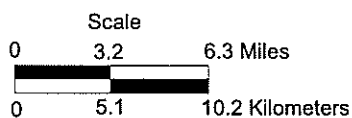


## EXPLANATION

- |  |                           |  |   |
|--|---------------------------|--|---|
|  | Launch Trajectory Azimuth |  | Tidewater Goby                                |
|  | Noise Contours            |  | Sea Otters                                    |
|  | Candidate Launch Site     |  | Roosting Location of California Brown Pelican |
|  |                           |  | Unarmored Threespined Stickleback             |



NORTH

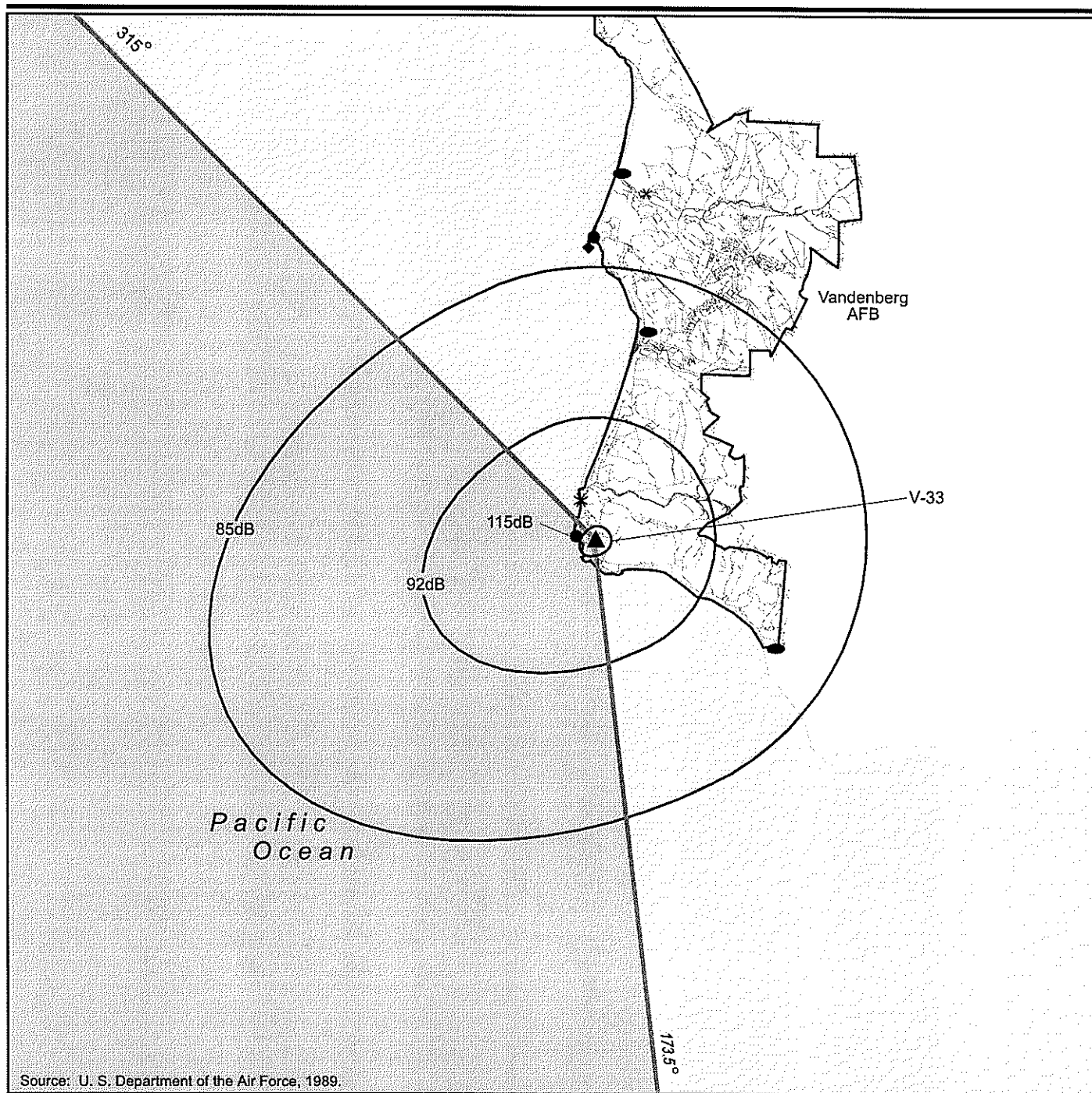


## Maximum Noise Levels for Single Launch of PAAT Missile at SLC-5

Group D, Vandenberg AFB

Figure A-29





#### EXPLANATION

- |  |                           |  |   |
|--|---------------------------|--|---|
|  | Launch Trajectory Azimuth |  | Tidewater Goby                                |
|  | Noise Contours            |  | Sea Otters                                    |
|  | Candidate Launch Site     |  | Roosting Location of California Brown Pelican |
|  |                           |  | Unarmored Threespined Stickleback             |



NORTH

Scale

0 3.2 6.3 Miles

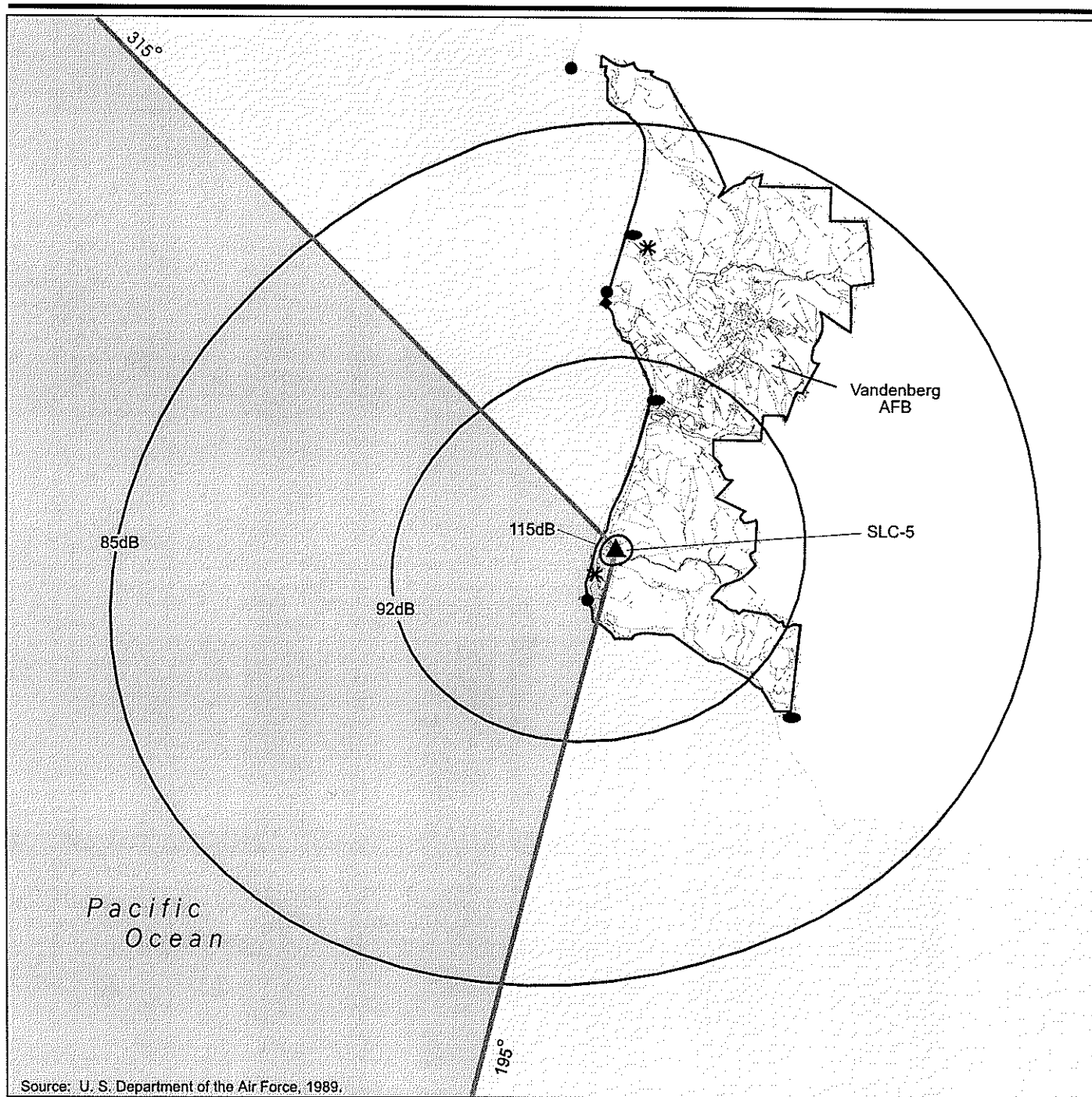
0 5.1 10.2 Kilometers

### Maximum Noise Levels for Single Launch of PAAT Missile at V-33

Group E, Vandenberg AFB

**Figure A-30**





#### EXPLANATION

- |  |   |  |                                   |
|--|---|--|-----------------------------------|
|  | Launch Trajectory Azimuth                     |  | Unarmored Threespined Stickleback |
|  | Candidate Launch Site                         |  | Tidewater Goby                    |
|  | Sea Otters                                    |  | Noise Contours                    |
|  | Roosting Location of California Brown Pelican |  |                                   |
- Scale
- 0 3.2 6.3 Miles
- 0 5.1 10.2 Kilometers
- NORTH

### Maximum Noise Levels for Single Rail Launch of Hera Missile, SLC-5

Vandenberg AFB

**Figure A-31**

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## Appendix B

### Consultation Letters

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# APPENDIX B

## CONSULTATION LETTERS

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### Informal Consultations

**U.S. Fish and Wildlife Service.** A video-teleconference was held at the U.S. Army Space and Strategic Defense Command on 14 August 1996 with Vandenberg AFB. Jim Watkins of the U.S. Fish and Wildlife Service attended and provided comments on species that could potentially be affected by the proposed action. Mr. Watkins wanted to receive the Description of Proposed Action and Alternatives and biological sections of the environmental assessment as they became available for review.

**National Marine Fisheries Service.** A briefing was given to the National Marine Fisheries Service on 5 September 1996 by Vandenberg AFB and the U.S. Army Space and Strategic Defense Command. Agreement was reached that formal intent-to-harass documentation would not be required. Irma Lagomarsino requested that the first launch of each type of target missile be monitored for potential impacts. Results of the monitoring would determine the need for additional actions. She also requested that noise frequency be used instead of merely decibels as related to human hearing.

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30 September 1996

Peter Douglas  
Executive Director  
California Coastal Commission  
45 Fremont Street, Suite 2000  
San Francisco, CA 94105-2219

**Subject: Coastal Consistency Determination—Theater Ballistic Missile Targets,  
Vandenberg Air Force Base, CA**

Dear Mr. Douglas:

The Department of the Air Force has initiated the environmental impact analysis process (EIAP) to support the Theater Ballistic Missile Targets program on Vandenberg AFB, and a large portion of the proposed project area is encompassed by the California coastal zone. Project specifics include launching of mobile target missiles from various locales on Vandenberg AFB and installation of a rail launcher, for larger missiles, at either the SLC-5 or V-33 site.

In compliance with Section 930.34, et seq. of National Oceanic and Atmospheric Administration federal coastal consistency regulations (15 CFR 930), the Air Force has reviewed Theater Ballistic Missile Targets activities in light of the Coastal Zone Management Act, the California Coastal Act, and the Santa Barbara County Coastal Plan and has found them to be consistent to the maximum extent practicable for the following reasons:

#### **Consistency with Provisions of the California Coastal Act**

Coastal planning and management policies of the California Coastal Act applicable to Theater Ballistic Missile Targets activities include:

##### **I. Article 2 - Public Access**

###### Section 30211. Development not to interfere with access

*(a) Development shall not interfere with the public's right of access to the sea where acquired through use or legislative authorization, including, but not limited to, the use of dry sand and rocky coastal beaches to the first line of terrestrial vegetation.*

Three public access beaches exist on, or immediately adjacent to, Vandenberg AFB: Point Sal State Beach; Ocean Beach County Park; and Jalama Beach County Park. Evacuation Agreement No. SPCVAN/1/93/0006, between Santa Barbara County and the base, allows evacuation and closure of said beaches not to exceed 48 hours before a launch. Beach closures would be restricted to an average of no more than 5 per year for this proposal. Launches may be conducted during the day or night.

##### **II Article 3 - Recreation**

###### Section 30220. Protection of certain water-oriented activities

*(a) Coastal areas suited for water-oriented recreational activities that cannot readily be provided at inland water areas shall be protected for such uses.*

In addition to the aforementioned state and county beaches, Wall and Seal beaches are open to limited (50 persons per weekend) public use, by permit, for surf fishing. As previously stated, beach closures would be restricted to an average of no more than 5 per year for this proposal. Launches may be conducted during the day or night.

### III Article 4 - Marine Environment

#### Section 30230. Marine resources; maintenance

*(a) Marine resources shall be maintained, enhanced, and, where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.*

Discussions with the National Marine Fisheries Service and formal consultation with the U.S. Fish and Wildlife Service has been initiated to ensure compliance with all applicable regulatory measures. The environmental assessment addresses potentially sensitive marine species and habitat along the coastline to evaluate potential effects from missile launch noise. Existing facilities and launch locations will be used and are located away from sensitive habitat, particularly pinniped haulout sites and the nesting locales for the western snowy plover and the California least tern, and launch personnel will be instructed to avoid such areas as well. Mobile launchers will operate from existing concrete pads, roads, or previously graded or graveled areas. Launches of larger missiles (such as the Hera target) will take place at either SLC-5 or V-33, from a 50K rail launcher installed on either an existing concrete pad or a previously graded or graveled area.

In some cases, marine fauna have demonstrated a tendency to react less to aural stimuli than to visual. The distance from various launch sites to the shore line ranges from approximately 400 ft to 11,400 ft. The altitude of the missile when it reaches the coastline will then be approximately 564 ft to 15,691 ft respectively. Due to the speed of the missile when it leaves the launcher, noise associated with a sonic boom occurs at ground level almost instantaneous with the launch. No sonic booms would occur over the coastline or offshore islands. In agreement with the NMFS, monitoring of the reaction of marine fauna to the noise will take place in order to observe potential effects. At this time, the NMFS does not believe a Harassment Authorization is required based on available noise data. Dependent upon the results of initial monitoring, the NMFS will review the need for a Harassment Authorization for future launches of similar missiles. The results will also determine whether or not monitoring will be necessary during subsequent launches.

### IV. Article 5 - Land Resources

#### Section 30240. Environmentally sensitive habitat areas; adjacent developments

*(a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on such resources shall be allowed within such areas.*

Project activities are located in areas that have been previously surveyed for sensitive habitats. The actual launch sites utilize existing facilities and are located away from sensitive areas. As such, routine launches would not impact sensitive habitat. For analysis of such environmental characteristics as noise or air quality, a “region of influence,” or ROI, is also analyzed. Those habitats that have been identified within launch ROIs include the following: (a) for North Vandenberg, Group A (LF-06, -07, -09, -25, and -26) and B (LF-21, -22, -23, -24) launches, roosting sites for California brown pelicans at Point Sal and Purisima Point areas, and nesting areas for the California least tern and Western snowy plover; (b) for North Vandenberg Group C (Rail Garrison site, Test Pad 1, ABRES-A, and 576-E sites) launches, habitat for two sensitive fish species, the tidewater goby and unarmored threespined stickleback, habitat for a rare plant species, Lompoc Yerba Santa, Southern sea otter habitat near Purisima Point, and pinniped haulout areas in the area between Purisima Point and Orange Beach County Park; (c) for South Vandenberg Group D (SLC-3W and SLC-5) launches, habitat for unarmored threespined stickleback, foraging areas for the California least tern, and nesting areas for the Western snowy plover; and (d) for South Vandenberg Group D (Boathouse Area or V-33 site) launches, pinniped haulout areas southeast of Point Arguello, and roosting sites for the California brown pelican near Point Arguello.

Again, personnel will be restricted to prevent any impacts to such areas. Effects upon air quality and from noise are addressed in Sections 30230 and 30253, respectively. As candidate launch sites are located on previously graded or graveled areas, disruption of sensitive vegetal habitats, such as Burton Mesa chaparral near Group C, will be prevented as well.

*(b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade such areas, and shall be compatible with the continuance of such habitat areas.*

Since project sites are located away from sensitive habitat areas and on existing launch facilities or previously disturbed areas, neither direct nor indirect impacts would occur to the aforementioned sensitive habitat. Parks are addressed under “Public Access,” above.

#### Section 30244. Archaeological or paleontological resources

*(a) Where development would adversely impact archaeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required.*

Mitigation measures have been developed and incorporated into the text of the EA to ensure the protection of all identified and unexpectedly discovered cultural resources. Mobile launch units will operate from existing concrete pads or roads and previously graded or graveled sites. No new construction will be required, except limited

installation for the rail launcher at either the V-33 site or SLC-5 site; as a result, ground disturbing activities would be virtually non-existent. There are no construction requirements for mobile launchers. Debris recovery impacts, from off-road vehicle activity, would only be necessitated in the event of missile malfunction. All recoverable hardware would be recovered in accordance with current Vandenberg AFB policy. Potential effects from pothunting, or illegal collection of artifacts, will be mitigated through orientation of personnel to cultural resource protective Federal regulations. Close coordination with the state Historic Preservation Officer and other applicable regulatory agencies will also serve to identify, locate, and protect any potential cultural resource sites.

Section 30253. Safety, stability, pollution, energy conservation, visitors

New development shall:

(a) *Be consistent with requirements imposed by an air pollution control district or the state Air Resources Control Board as to each particular development.*

Contact has been made with the Santa Barbara County Air Pollution Control District offices to ensure compliance with regulatory requirements. The determination has been made that the Theater Ballistic Missile Targets program will not impact air quality. Emission levels allow the project to include both inland and outer continental shelf levels. A Record of Non-Applicability (RONA) is being drafted stating that Theater Ballistic Missile Targets will neither exceed maximum levels for those criteria pollutants for which Santa Barbara County is in non-attainment (specifically, ozone and PM-10); nor will the project be regionally significant.

(b) *Where appropriate, protect special communities and neighborhoods which, because of their unique characteristics, are popular visitor destination points for recreational uses.*

Popular visitor destination points within the immediate Vandenberg AFB area are addressed under "Public Access" and "Recreation," above.

**Consistency with Provisions of the Santa Barbara County Coastal Plan**

Although Sections 2.1 and 4.7 of the Santa Barbara County Coastal Plan specifically exempt Vandenberg AFB from local land use controls, Theater Ballistic Missile Targets program activities were reviewed against the coastal resource protection and development policies of this plan (Chapter 3) and found to be consistent, to the maximum extent practicable, with these regulations.

For the aforementioned reasons, the Air Force believes that the proposed program to perform Theater Ballistic Missile Target activities at Vandenberg AFB will not adversely affect the coastal zone and requests a Coastal Consistency Negative Determination. If you have any questions, please contact Jim Johnston, Vandenberg AFB Environmental Office, at (805) 734-8232, ext. 50633.

Very truly yours,



STATE OF CALIFORNIA - THE RESOURCES AGENCY

PETE WILSON, Governor

## CALIFORNIA COASTAL COMMISSION

46 FREMONT STREET, SUITE 2000  
SAN FRANCISCO, CA 94105-2278  
VOICE AND TDD (415) 304-3200



November 22, 1996

TO: Jim Johnston, VAFB

FROM: Jim Raives  
Federal Consistency Coordinator

RE: Theater Ballistic Missile Targets, Vandenberg Air Force Base

Jim,

Per your request, I have reviewed the draft consistency determination for the above referenced project. I assume that you intend to send a copy of the NEPA document with this consistency determination. If not, the consistency determination is lacking in project detail. The Air Force should revise the consistency determination to expand the project description, and provide more details of launch site locations and existing resources at the locations. Additionally, some detailed maps would be helpful.

The project raises at least two resource issues that are of concern to the Commission staff. First, the Commission staff is concerned about the project's effect on public access and recreational resources. As you know, the Commission staff does not generally oppose beach closures associated with launch activities on Vandenberg. Our concern, as always, is that the Air Force implements reasonable measures to minimize the need for beach closures. To that end, the Air Force should revise the consistency determination to include a discussion of alternative launch sites that avoid or reduce the need for beach closures and, if necessary, other measures that would reduce the duration of the closure or its effect on recreational use. Finally, the consistency determination restricts the number of beach closures to "an average of no more than 5 per year." Since the word "average" allows for some uncertainty in number of beach closures in any given year, the Commission staff would prefer a maximum limit, even if that number is greater than five. If you choose to identify a maximum number of beach closures, the Air Force could always allow for a greater number of beach closures by submitting supplemental consistency determinations.

The second issue of concern is the project's effect on sensitive habitat. The Commission staff believes that the Air Force should revise the consistency determination to include more details about the consultation with U.S. Fish and Wildlife Service and National Marine Fisheries Service. At a minimum, the consistency determination should include a summary of the opinions and conclusions of these two agencies and the status of any consultation. Additionally, the consistency determination should include a copy of any

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**Appendix C**  
**Determination of Non-Applicability**  
**Theater Ballistic Missile Targets**  
**Environmental Assessment,**  
**Vandenberg Air Force Base, California**

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# DETERMINATION OF NON-APPLICABILITY THEATER BALLISTIC MISSILE TARGETS ENVIRONMENTAL ASSESSMENT, VANDENBERG AIR FORCE BASE, CALIFORNIA

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The Draft Theater Ballistic Missile Targets Environmental Assessment was completed in 1997. The project proposes using launch sites at Vandenberg Air Force Base (VAFB), California, to launch theater ballistic target missiles. Missiles representative of this class of missiles include two major categories. The first is composed of small, mobile missiles such as the HERMES, PATRIOT as a Target (PAAT), and Lance-like missiles. The second consists of larger, rail-launched missiles such as the Hera and Storm target missiles.

The Clean Air Act (CAA), as amended in 1990, specifies in section 176(a) that no department, agency, or instrumentality of the Federal Government shall engage in, support in any way, or provide financial assistance for, license or permit, or approve, any activity which does not conform to an implementation plan after it has been approved or promulgated under section 110 of this title. Conformity is defined in Section 176(c) of the CAA as conformity to the State Implementation Plan's purpose of eliminating or reducing the severity and number of violations of the National Ambient Air Quality Standards (NAAQS) and achieving expeditious attainment of such standards. These activities will not:

- Cause or contribute to any new violation of any standard in any area
- Increase the frequency or severity of any existing violation of any standard in any area
- Delay timely attainment of any standard or any required interim emission reduction or other milestones in any area

Air quality in the area of VAFB is under the jurisdiction of the Santa Barbara County Air Pollution Control District (SBCAPCD). Santa Barbara County is classified as being in serious non-attainment with respect to Federal ozone standards and non-attainment with respect to State standards for particulate matter under 10 microns in diameter (PM10).

Estimates of potential air quality impacts were determined in coordination with personnel at the Santa Barbara Air Pollution Control District and Vandenberg Air Force Base. Computer modeling of projected mobile emissions was conducted as specified below.

Potential emissions are less than the Federal *de minimis* (minimal) levels established in 40 CFR 51.853(b)(1). Additionally, potential maximum daily Reactive Organic Gases (ROG) and Nitrogen Oxide (NO<sub>x</sub>) levels are less than 10 percent of the SBCAPCD budget planning values for 1996.

No Federal *de minimis* levels have been established for State non-attainment areas. However, potential emissions are less than the Federal *de minimis* level for moderate Federal PM10 non-attainment. Additionally, since the region is in Federal attainment, SBCAPCD has not established 1996 planning values for PM10. Therefore, no quantitative analysis of regional significance can be made.

Based on the air quality analysis described in the Theater Missile Defense Target Environmental Assessment, I have determined that the proposed project is presumed to be in conformity with the State's Implementation Plan because potential project emissions are less than the Federally mandated *de minimis* thresholds and less than 10 percent of SBCAPCD budget planning levels. Therefore, a Conformity Determination is not required.

XX  
Environmental Coordinator

## Introduction

The study below is divided into three sections. Section one describes the methodologies used to project potential mobile emissions and missile preparation and launch emissions. Section two addresses the Federal *de minimis* thresholds and how it was determined that the project activity emissions would be less than the *de minimis* thresholds. Section three addresses regional significance and how it was determined that project activity emissions would not be regionally significant. Section two and three must be addressed separately because the *de minimis* thresholds are measured in tons per year and SBCAPCD planning values for regional significance are measured in tons per day.

Various aspects of the project are unspecified at this time. This is intentional on the part of the project planner so as to allow maximum flexibility in actual operations. Due to this built-in operational flexibility, realistic emissions, while lower than theoretically possible emissions, are indeterminable. Therefore, this study uses the theoretical maximums. This follows the logic that if the projected maximum emissions are (1) less than the *de minimis* thresholds and (2) not regionally significant, then any level of activity less than these maximums will also meet the same requirements. In order to present a conservative estimate of environmental impact, the following assumptions are used throughout all sections of the study:

- The proposed action does not specify the number of personnel required to attend each launch. However, the Theater Missile Defense Extended Test Range Environmental Impact Statement suggests a maximum of 70 personnel will be present for up to 2 weeks per launch. Since the proposed action would be conducted year-round, this study will assume 70 additional personnel stationed at Vandenberg Air Force Base.
- The proposed action requires the capability to launch up to 30 missiles per year, with a maximum of 5 launches in a 3-day window. No further specifics of missile types or launch times is given. Therefore, this study assumes the missile with the highest level of emissions will be launched for all 30 launches. The determination of which missile emits the highest level of pollutant is made separately for each pollutant.
- The proposed action does not specify a number of launch vehicles per launch. However, the Army Mountain Top Experiment Environmental Assessment suggests that a representative PATRIOT battery would consist of up to 14 vehicles. AP-42 classifies these vehicles as heavy-duty diesel. This study assumes a maximum number of 14 heavy-duty diesel launch vehicles per launch.
- The proposed action does not specify the storage location of the missiles. It also does not specify a specific launch site. For the purposes of this study mobile emissions assume the missile transports and personnel must travel the length of the base (approximately 30 miles) to and from the launch site for a total of 60 miles per launch.
- This study assumes each personnel member will travel separately to and from the launch site. The vehicle mix was calculated as described in the mobile-emissions methodology section.

### **Mobile Emissions Methodology and Calculations**

Projected vehicle emission factors were calculated using the California Department of Transportation model CT-EMFAC (California Department of Transportation, 1994). The model uses California Air Resources Board EMFAC7F version 1.1 emission factors. The model requires year, temperature, vehicle mix percentages, cold and hot start percentages, vehicle speed increment, and inspection and maintenance data from the user before calculating winter or summer carbon monoxide (CO), ROG, NO<sub>x</sub>, and/or PM<sub>10</sub> emission factors.

The CT-EMFAC model was set-up to calculate emission factors in 1 mile per hour (mph) increments from 3 to 65 mph. The model's inspection and maintenance flag was turned on since vehicle inspection and maintenance occur within the county. The proposed action is a multiyear project. Vehicles in 1997 would generate greater emissions than vehicles in the following years due to the "phasing-out" of older (dirtier) vehicles. Therefore, vehicle emissions factors were calculated for the year 1997, following the logic mentioned above that if the project meets the *de minimis* and regional significance requirements at the maximum levels, then it will also meet them at reduced emission levels.

Following current California Department of Transportation methodologies, a temperature of 50° Fahrenheit (°F) was assumed for the vehicle emission factor calculations (California Department of Transportation, 1988). Emission factors were calculated for two sets of vehicles; the missile battery vehicles and the support personnel commute vehicles. Summer and winter emission factors were calculated for both vehicle sets. Emission factors for the missile battery vehicles were made assuming 100 percent of the vehicles were heavy-duty diesel trucks. Because only diesel vehicles were used for these model runs, cold and hot start inputs were not required. Emission factors for the support personnel commute vehicles (81.1 percent light duty automobiles and 18.9 percent light-duty trucks) were made using a weighted vehicle mix from a 1997 BURDEN7F computer model run for Santa Barbara County (California Air Resources Board, 1994). Two sets of support personnel commute vehicles model runs were completed. The first utilized 100 percent cold starts and 0 percent hot starts. The second utilized 0 percent cold starts and 0 percent hot starts (100 percent hot stabilized). Current methodologies dictate that the first 3.59 miles of each trip will use the 100 percent cold-start emissions factors and the remainder will use the 0 percent cold-start/0 percent hot start (100 percent hot stabilized) emissions factors.

The previously stipulated assumptions require 30-mile trips. Therefore, for each one-way trip made by support personnel commute vehicles, the first 3.59 miles use the emission factors from the 100 percent cold start run. The remaining 26.41 miles of the support personnel commute vehicle trips use the emission factors from the 0 percent cold start/0 percent hot start (100 percent hot stabilized) run.

The greatest emissions would be obtained if all vehicles traveled at low speeds. Therefore, emissions factors for 10 miles per hour are used in these calculations. Actual speeds (especially for the commute vehicles) would probably be faster. This would result in less emissions.

Using these calculations, the maximum emissions for two 30-mile trips (one 60-mile round trip commute) are listed in table C-1.

**Table C-1: Mobile Emissions Data and Calculations (at 50° F)**

Vehicle Information	Carbon Monoxide (CO)	Reactive Organic Gas (ROG)	Oxides of Nitrogen (NO <sub>x</sub> )	Particulate Matter (PM)
1 commuter: Cold Start (first 3.59 miles)	91.31 grams/mile	7.99 grams/mile	2.79 grams/mile	0.01 grams/mile
1 commuter: Hot Stabilized (after first 3.59 miles)	9.24 grams/mile	1.59 grams/mile	0.93 grams/mile	0.01 grams/mile
1 commuter: Total (round-trip emissions)	1.14 kg	0.141 kg	0.69 kg	0.0006 kg
70 commuters: total (round-trip emissions)	80.08 kg	9.90 kg	4.8 kg	0.040 kg

1 Heavy-duty Truck (HDV)	25.40 grams/mile	5.00 grams/mile	16.47 grams/mile	1.86 grams/mile
1 HDV (round-trip)	1.524 kg	0.300 kg	0.9882 kg	0.112 kg
14 HDVs (round-trip)	21.34 kg	4.20 kg	13.83 kg	1.57 kg
Commuter exhaust/launch	80.08 kg (176.5 lb.)	9.90 kg (21.8 lb.)	4.8 kg (11 lb.)	0.040 kg (0.088 lb.)
Missile transport exhaust/launch	21.34 kg (47.05 lb.)	4.20 kg (9.26 lb.)	13.83 kg (30.49 lb.)	1.57 kg (3.46 lb.)
Total Emissions/launch	101.42 kg (223.59 lb.)	14.10 kg (31.08 lb.)	18.6 kg (41.0 lb.)	1.61 kg (3.55 lb.)

### Missile Emissions Methodology

As per telephone conversation with Lockheed-Martin program manager, Jim Tevebaugh, no VOC/ROG will be used in missile preparation activities. The Environmental Assessment for the U.S. Army Kwajalein Atoll Temporary Extended Test Range establishes that the fueling of the liquid-propellant fueled missiles may result in approximately 15 grams of Inhibited Red fuming Nitric Acid (IRFNA) being released into the atmosphere. No measurable release of unsymmetrical dimethyl hydrazine (UDMH) into the atmosphere is indicated.

In order to avoid lengthy computer modeling and retain maximum flexibility in project actions, the assumption was made that 100 percent of missile exhaust products are released at or near ground-level. In reality, only a small portion of the exhaust products will be released in the launch area. Data on exhaust components was collected from a variety of sources to determine which missile type would emit the greatest amount of each pollutant.

Table C-2 displays the criteria exhaust components of various rocket engines.

**Table C-2: Missile Launch Exhaust Products**

Missile	CO (lb./launch)	ROG (lb./launch)	NO <sub>x</sub> (lb./launch)	Pb (lb./launch)	PM (lb./launch) <sup>b</sup>
Lance	43.67	0 <sup>a</sup>	<b>3.57</b>	<b>0.400</b>	0
PATRIOT-As-A-Target (PAAT)	325.6	0	0	0	404.8
Hera or Storm (SR19-AJ-1)	<b>2913</b>	0	0	0	<b>3879</b>
Castor I	2044	0	0	0	1934
Strypi II (Castor I + 2 Recruit strap-on boosters)	2180	0	0	0	1970 <sup>c</sup>

a. Lance emits CH<sub>4</sub> which is specifically exempted from the ROG category.

b. The PM here is Al<sub>2</sub>O<sub>3</sub>. For conservative analysis, all PM exhaust is considered to be PM-10.



c. PM values for the STRYPI II consist of Al<sub>2</sub>O<sub>3</sub>, FeCl<sub>2</sub>, and sulfur. Some of these may be gaseous at exhaust temperatures.  
Note: **Bolded** values are the maximum for each exhaust product.

### *De minimis* Thresholds

The *de minimis* thresholds are Federal limits listed in 40 CFR 51.583(b)(1). If any of the project emissions would exceed these values, a conformity determination is required. Table C-3 defines the *de minimis* thresholds.

**Table C-3: *De minimis* Threshold and Potential Project Emissions for Criteria Pollutants**

Criteria Pollutant	<i>De minimis</i> Threshold	Potential Emissions
VOC	50 tons per year in Federal Serious Non-attainment Area	3.19 tons per year
NO <sub>x</sub>	50 tons per year in Federal Serious Non-attainment Area	2.0 tons per year
CO	100 tons per year in All Federal Non-attainment Areas	69.1 tons per year
SO <sub>2</sub> or NO <sub>2</sub>	100 in All Federal Non-attainment Areas	0 tons per year
PM <sub>10</sub>	100 tons per year in Federal Moderate Non-attainment Area	58 tons per year
Lead (Pb)	25 tons per year in all Federal Non-attainment Areas	< 1 ton per year

VOC Volatile Organic Compound (This is the Federal Designation for ROG). While there are minor differences between ROG and VOC, within the scope of this study they are interchangeable.

Calculation of the potential annual emissions is conducted along the following lines:

1. Assume the maximum of thirty launches is conducted.
2. Total emissions per launch equal the mobile emissions plus launch emissions.
3. Total annual commuter emissions must be added to achieve a yearly total. For this, the assumption was made that 70 personnel would commute 60 miles round trip 5 days per week, 50 weeks per year (250 trips per year per person).

Following the above three steps, the following amount of each pollutant is projected:

- **Calculation format:**  
 $(30 \text{ launches} \times (\text{vehicle exhaust} + \text{missile exhaust})) + (250 \text{ commuter trips} \times \text{exhaust})$
- **CO:**  
 $30 \times (223.59 \text{ lb} + 2,913 \text{ lb}) + (250 \times 176.5 \text{ lb}) = 138,200 \text{ lb} = 69.1 \text{ tons per year}$
- **VOC (ROG):**  
 $30 \times (31.08 \text{ lb} + 0 \text{ lb}) + (250 \times 21.8 \text{ lb}) = 6,380 \text{ lb} = 3.19 \text{ tons per year.}$
- **NO<sub>x</sub>:**  
 $30 \times (41.0 \text{ lb} + 3.57 \text{ lb}) + (250 \times 11 \text{ lb}) = 4,100 \text{ lb} = 2.0 \text{ tons per year.}$
- **PM-10:**  
 $30 \times (3.55 \text{ lb} + 3879 \text{ lb}) + (250 \times 0.088 \text{ lb}) = 120,000 \text{ lb} = 58 \text{ tons per year.}$
- **Pb:**  
 $30 \times (0 + 0.400 \text{ lb}) = 12.0 \text{ lb} = 0.006 \text{ tons per year.}$
- **SO<sub>2</sub> and/or NO<sub>2</sub>:** None

Table C-3 displays these results in relation to the appropriate *de minimis* threshold.

Total potential project emissions would be less than the Federal *de minimis* thresholds. Therefore, the project meets the *de minimis* requirement for non-applicability.

## Regional significance

Regional significance is the second part of the General Conformity analysis. Even if a project will emit less than the *de minimis* thresholds of all pollutants, it may still produce significant amounts of pollutants based on the area in which the project is to take place. Therefore, any action which produces ten percent or more of an area's budgeted amount for a Federally non-attained pollutant will be considered regionally significant and must conduct a conformity determination.

Santa Barbara County is in federal non-attainment for Ozone. Therefore, the only pollutants requiring budgeting are ozone and ozone precursors, specifically VOC and NO<sub>x</sub>. Federal regulations refer to VOC instead of ROG. There are minor differences between the two, but for the purposes of this study they can be considered to be synonymous. Ozone is not addressed in this study because the proposed actions would not generate ozone.

SBCAPCD's budget planning values are presented as maximum daily emissions (43.87 tons per day ROG and 56.05 tons per day NO<sub>x</sub>). Therefore, the determination of regional significance is based on the maximum amount of a pollutant emitted in a single day.

The proposed action calls for a maximum of five launches in 3 days. While highly improbable, all five of these launches could theoretically occur in a 24-hour period. Therefore, this analysis uses five launches in 1 day for the regional significance determination.

Calculation of the maximum daily emissions are conducted along the following lines:

1. Assume five launches are conducted in 1 day.
2. Total emissions for one launch equal mobile emissions plus exhaust emissions.
3. Total daily emissions equal five launch emissions (includes five separate commuter trips in one 24-hour period).
4. No additional (non-launch) commuter emissions are added, as it is assumed all personnel are involved in the launches.

Following the above three steps, the following amount of each pollutant is projected:

- **Calculation format:**  $5 \times (\text{vehicle exhaust} + \text{missile exhaust})$
- **ROG:**  $5 \times (31.08 \text{ lb.} + 0 \text{ lb.}) = 155.4 \text{ lb.} = 0.07770 \text{ tons.}$
- **NO<sub>x</sub>:**  $5 \times (41.0 \text{ lb.} + 3.57 \text{ lb.}) = 223 \text{ lb.} = 0.112 \text{ tons.}$

Table C-4 displays the relationship between the daily budgeted amounts and potential emissions due to the proposed action.

**Table C-4: Regional Budget and Potential Emissions for Ozone Precursors**

Pollutant	Daily Budget	10% of Budget	Potential Emissions	Regionally Significant?
Values are given in tons per day (tpd)				
NO <sub>x</sub>	56.05	5.605	< 1	No
ROG	43.87	4.387	< 1	No

Potential project emissions would not amount to ten percent or more of SBCAPCD budget planning values for NO<sub>x</sub> or ROG. Therefore, this project would not be regionally significant.

In conclusion, the estimated emissions due to the proposed action would not exceed the *de minimis* thresholds and would not be regionally significant. Therefore, it should be ruled as being exempt from the requirement for a Conformity Determination due to non-applicability as defined in 40 CFR 51.853(c)(1) and 40 CFR 51.853(i).

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**Appendix D**  
**Environmental Resources, Applicable Laws and**  
**Regulations, and Compliance Requirements**

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# APPENDIX D

## ENVIRONMENTAL RESOURCES, APPLICABLE LAWS AND REGULATIONS, AND COMPLIANCE REQUIREMENTS

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The following Federal environmental laws and regulations were reviewed to assist in determining the significance of environmental impacts under the National Environmental Policy Act (NEPA).

**Airspace**—The Federal Aviation Act of 1958 (Public Law 85-726) created the Federal Aviation Agency (later Administration) to provide for the regulation and promotion of civil aviation in such a manner as to best foster its development and safety and to provide for the safe and efficient use of airspace by both civil and military aircraft, contribute to national security, and provide for other purposes.

The Federal Aviation Administration (FAA), as an operating agency under the Department of Transportation, has further developed its purpose to include regulating air commerce to foster aviation safety, developing a national system of airports, and achieving efficient use of airspace. In addition, it is charged with operating common air traffic control and air navigation systems for both civil and military users.

The FAA's most important mission is to ensure safe and efficient use of the national airspace. The National Airspace System (NAS) is based on an extensive network of air traffic control computers, surveillance, communication, navigation, and landing systems.

**Air Quality**—The Clean Air Act seeks to achieve and maintain air quality to protect public health and welfare (42 United States Code [USC] 7401 et seq.). To accomplish this, Congress directed the Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards (NAAQS). Primary standards protect public health; secondary standards protect public welfare (e.g., vegetation, property damage, scenic value). NAAQS address six criteria pollutants: carbon monoxide, nitrogen oxides, lead, sulfur dioxides, ozone, and particulates.

Primary responsibility to implement the Clean Air Act rests with each state. However, each state must submit a state implementation plan (SIP) outlining the strategy for attaining and maintaining the NAAQS within the deadlines established by the act. If the state does not provide a SIP that is acceptable to the EPA, the EPA will provide a SIP which the state is then required to enforce.

The Clean Air Act mandates establishment of performance standards, called New Source Performance Standards, for selected categories of new and modified stationary sources to keep new pollution to a minimum. Under the act, the EPA can establish emission standards for hazardous air pollutants for both new and existing sources. So far, the EPA has set National Emission Standards for Hazardous Air Pollutants (NESHAP) for beryllium,

mercury, asbestos, vinyl chloride, and other hazardous materials including radioactive materials.

The Clean Air Act also seeks to prevent significant deterioration of air quality in areas where the air is cleaner than that required by the NAAQS. Areas subject to prevention of significant deterioration regulations have a Class I, II, or III designation. Class I allows the least degradation.

Nonattainment policies also exist. A nonattainment area is one where monitoring data or air quality modeling demonstrates a violation of the NAAQS. The most widespread violation of the NAAQS is related to ozone. For ozone, urban areas are sorted into five categories: marginal, moderate, serious, severe, and extreme. Additionally, stratospheric ozone and climate protection policies have been established. Interim reductions in the use of chlorofluorocarbons, methyl chloroforms, and halons have been mandated.

Hydrochlorofluorocarbons must be phased out of production beginning in 2015, with production elimination set for 2030. State and local governments are required to implement policies which prevent construction or modification of any source that will interfere with attainment and maintenance of ambient standards. A new source must demonstrate a net air quality benefit. The source must secure offsets from existing sources to achieve the air quality benefit.

The Clean Air Act Amendments of 1990 represent the first significant revisions to the Clean Air Act in the past 13 years (42 USC 7401 et seq.). The amendments strengthen and broaden earlier legislation by setting specific goals and timetables for reducing smog, airborne toxins, acid rain, and stratospheric ozone depletion over the next decade and beyond.

The Clean Air Act Amendments of 1990 contain 11 major titles which address various issues of the National Air Pollution Control Program. Title I, Attainment and Maintenance of National Ambient Air Quality Standards, mandates technology-based emissions control for new and existing major air pollution sources. Title II, Mobile Sources, deals with emissions control for motor vehicles in the form of tailpipe standards, use of clean fuels, and mandatory acquisition of clean-fuel vehicles. Hazardous Air Pollutants, Title III, mainly addresses the control of hazardous air pollutants (HAPs) and contingency planning for the accidental release of hazardous substances. There are 189 HAPs identified in the new amendments. Title IV, Acid Rain, focuses on the reduction of sulfur dioxide and nitrogen oxides in the effort to eliminate acid rain. Permits, Title V, establishes a nationwide permit program for air pollution sources. The permits will clarify operating and control requirements for affected stationary sources. Stratospheric Ozone Protection, Title VI, restricts the production and use of chlorofluorocarbons, halons, and other halogenated solvents which, when released into the atmosphere, contribute to the decomposition of stratospheric ozone. Title VII, Enforcement, describes civil and criminal penalties which may be imposed for the violation of new and existing air pollution control requirements. Title VIII of the 1990 amendments contains various miscellaneous provisions concerning the outer continental shelf, international border areas, grants, secondary standards, renewable energy incentives, and visibility. Information and rules related to clean air research can be found in Title IX. The EPA is to conduct studies on improved methods and techniques for measuring individual air pollutants, health effects associated with exposure

to air pollutants, improvements in predictive models and response technology for accidental releases of dense gas, acid precipitation, clean fuels, and improved studies on the ecosystem, among others. Title X requires that a certain percentage of Federal funds, set aside for research required under the act, be made available to disadvantaged businesses. Title XI contains laws pertaining to Clean Air Employment Transition Assistance. Topics covered in this title include the Job Partnership Training Act provisions, funding, benefits, and eligibility requirements.

**Biological Resources**—The Endangered Species Act declares that it is the policy of Congress that all Federal departments and agencies shall seek to conserve endangered species and threatened species (16 USC 1531 et seq.). Further, the act directs Federal agencies to use their authorities in furtherance of the purposes of the act.

Under the Endangered Species Act, the Secretary of the Interior creates lists of endangered and threatened species. The term endangered species means any species which is in danger of extinction throughout all or a significant portion of its range. The act defines a threatened species as any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

A key provision of the Endangered Species Act for Federal activities is Section 7 consultation. Under Section 7 of the act, every Federal agency must consult with the Secretary of the Interior, U.S. Fish and Wildlife Service (USFWS), to ensure that any agency action (authorization, funding, or execution) is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of habitat of such species.

The Bald and Golden Eagle Protection Act establishes penalties for the unauthorized taking, possession, selling, purchase, or transportation of bald or golden eagles, their nests, or their eggs (16 USC 668 et seq.). Any Federal activity that might disturb eagles requires consultation with the USFWS for appropriate mitigation.

Through the Fish and Wildlife Coordination Act, Congress encourages all Federal departments and agencies to utilize their statutory and administrative authority, to the maximum extent practicable and consistent with each agency's statutory responsibilities, to conserve and promote conservation of nongame fish and wildlife and their habitats (16 USC 2901 et seq.). Further, the act encourages each state to develop a conservation plan.

The Fish and Wildlife Coordination Act requires a Federal department or agency that proposes or authorizes the modification, control, or impoundment of the waters of any stream or body of water (greater than 4.1 hectares [10 acres]), including wetlands, to first consult with the USFWS. Any such project must make adequate provision for the conservation, maintenance, and management of wildlife resources. The act requires a Federal agency to give full consideration to the recommendations of the USFWS and to any recommendations of a state agency on the wildlife aspects of a project.

The Migratory Bird Treaty Act protects many species of migratory birds (16 USC 703-712). Specifically, the act prohibits the pursuit, hunting, taking, capture, possession, or killing of such species or their nests and eggs. The act further requires that any affected

Federal agency or department must consult with the USFWS to evaluate ways to avoid or minimize adverse effects on migratory birds.

The Marine Mammal Protection Act (16 USC 1361 et seq.) establishes a moratorium on the taking and importation of marine mammals and marine mammal products. The act also provides for penalties for the use of fishing methods in contravention of any regulations or limitations enacted by governmental agencies to achieve the purposes of the Marine Mammal Act. The Marine Mammal Commission, which was established under the act, reviews laws and international conventions, studies world-wide populations, and makes recommendations to Federal officials concerning marine mammals.

**Cultural Resources**—The Historic Sites Act of 1935 authorizes the Secretary of the Interior to designate areas as national natural landmarks for listing on the National Registry of Natural Landmarks (16 USC 461 et seq.). In conducting an environmental review of a proposed Federal agency action, the responsible official shall consider the existence and location of natural landmarks using information provided by the National Park Service pursuant to 35 Code of Federal Regulations (CFR) 62.6(d) to avoid undesirable impacts upon such landmarks.

Under Section 106 of the National Historic Preservation Act (16 USC 470 et seq.) and Executive Order 11593, if a Federal agency undertaking affects any property with historic, architectural, archaeological, or cultural value that is listed on or eligible for listing on the National Register of Historic Places, the responsible official shall comply with the procedures for consultation and comment promulgated by the Advisory Council on Historic Preservation in 36 CFR Part 800. The responsible official must identify properties affected by the undertaking that are potentially eligible for listing on the National Register and may request a determination of eligibility from the Keeper of the National Register, Department of the Interior, under the procedures in 36 CFR Part 63.

Under the National Historic Preservation Act, if a Federal agency activity may cause loss or destruction of significant scientific, prehistoric, historic, or archaeological property, the responsible official or the Secretary of the Interior is authorized to undertake data recovery and preservation activities. Data recovery and preservation activities shall be conducted in accordance with implementing procedures promulgated by the Secretary of the Interior.

**General**—The NEPA (42 USC 4321 et seq.) is the basic U.S. charter for protection of the environment. It establishes policy, sets goals, and provides means for carrying out the policy. The NEPA contains "action-forcing" provisions to make sure that Federal agencies act according to the letter and the spirit of the act. The NEPA procedures must ensure that environmental information is available to public officials and citizens before Federal decisions are made and before actions are taken. Accurate scientific analysis, expert agency comments, and public scrutiny are essential to implementing the NEPA. The NEPA process is intended to help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment.

The Council on Environmental Quality Regulations for Implementing the Procedural Provisions of the NEPA (40 CFR 1500-15080) are issued pursuant to the NEPA; the



Environmental Quality Improvement Act of 1970, as amended (42 USC 4371 et seq.); section 309 of the Clean Air Act, as amended (42 USC 7609); and Executive Order 11514, Protection and Enhancement of Environmental Quality (as amended by Executive Order 11991). The purpose of the regulations is to provide direction to Federal agencies so they understand how to comply with the procedures and achieve the goals of the NEPA process.

**Hazardous Materials and Waste**—Under the Resource Conservation and Recovery Act (RCRA), Congress declares the national policy of the United States to be, whenever feasible, the reduction or elimination, as expeditiously as possible, of hazardous waste (42 USC 6901 et seq.). Waste that is nevertheless generated should be treated, stored, or disposed of so as to minimize the present and future threat to human health and the environment.

The RCRA defines hazardous waste as solid waste which, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may cause or contribute to mortality or serious illness. The EPA has further defined hazardous waste through four characteristics: ignitability, corrosivity, reactivity, or toxicity. Once defined as a hazardous waste, the RCRA establishes a comprehensive cradle-to-grave program to regulate hazardous waste from generation through proper disposal or destruction.

The RCRA also establishes a specific permit program for the treatment, storage, and disposal of hazardous waste. Both interim status and final status permit programs exist.

Any underground tank containing hazardous waste is also subject to RCRA regulation. Under the act, an underground tank is one with 10 percent or more of its volume underground. Underground tank regulations include design, construction, installation, and release-detection standards.

The RCRA defines solid waste as any garbage, refuse, or sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semi-solid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations and from community activities. To regulate solid waste, the RCRA provides for the development of state plans for waste disposal and resource recovery. The RCRA encourages and affords assistance for solid waste disposal methods that are environmentally sound, maximize the utilization of valuable resources, and encourage resource conservation. The RCRA also regulates mixed wastes. A mixed waste contains both a hazardous waste and radioactive component.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)—commonly known as Superfund—provides for funding, cleanup, enforcement authority, and emergency response procedures for releases of hazardous substances into the environment (42 USC 9601 et seq.).

The CERCLA covers the cleanup of toxic releases at uncontrolled or abandoned hazardous waste sites. By comparison, the principal objective of the RCRA is to regulate active hazardous waste storage, treatment, and disposal sites to avoid new Superfund sites. The RCRA seeks to prevent hazardous releases; a release triggers the CERCLA.

The goal of the CERCLA-mandated program (Superfund) is to clean up sites where releases have occurred or may occur. A trust fund supported, in part, by a tax on petroleum and chemicals supports the Superfund. The Superfund allows the Government to take action now and seek reimbursement later.

The CERCLA also mandates spill-reporting requirements. The act requires immediate reporting of a release of a hazardous substance (other than a Federally permitted release) if the release is greater than or equal to the reportable quantity for that substance.

Title III of the Superfund Amendments and Reauthorization Act (SARA) (42 USC 9601 et seq.) is a freestanding legislative program known as the Emergency Planning and Community Right to Know Act of 1986. The act requires immediate notice for accidental releases of hazardous substances and extremely hazardous substances; provision of information to local emergency planning committees for the development of emergency plans; and availability of Material Safety Data Sheets, emergency and hazardous chemical inventory forms, and toxic release forms. (Emergency Planning and Community Right-to-Know Act of 1986, 42 USC 11001 et seq.)

The Emergency Planning and Community Right to Know Act (EPCRA) of 1986 requires each state to designate a state emergency response commission. In turn, the state must designate emergency planning districts and local emergency planning commissions (42 USC 11001 et seq.). The primary responsibility for emergency planning is at the local level.

The Pollution Prevention Act of 1990 established that pollution should be prevented at the source, recycled or treated in an environmentally safe manner, and disposed of or otherwise released only as last resort. Executive Order 12856, "Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements," commits Federal agency planning, management, and acquisition to the Pollution Prevention Act of 1990. It also requires all Federal facilities to comply with the EPCRA, develop a written pollution prevention strategy emphasizing source reduction, and develop voluntary goals to reduce total releases and off-site transfers of Toxic Release Inventory toxic chemicals by 50 percent by 1999.

The Toxic Substances Control Act (TSCA) authorizes the administrator of the EPA broad authority to regulate chemical substances and mixtures which may present an unreasonable risk of injury to human health or the environment (15 USC 2601 et seq.).

Under the TSCA the EPA may regulate a chemical when the administrator finds that there is a reasonable basis to conclude that the manufacture, processing, distribution in commerce, use, or disposal of a chemical substance or mixture poses or will pose an unreasonable risk of injury to health or the environment.

Under the TSCA the EPA administrator, upon a finding of unreasonable risk, has a number of regulatory options or controls. The EPA's authority includes total or partial bans on production, content restrictions, operational constraints, product warning statements, instructions, disposal limits, public notice requirements, and monitoring and testing obligations.

The TSCA Chemical Substance Inventory is a database providing support for assessing human health and environmental risks posed by chemical substances. As such, the inventory is not a list of toxic chemicals. Toxicity is not a criterion used in determining the eligibility of a chemical substance for inclusion on the inventory.

**Health and Safety**—The purpose of the Occupational Safety and Health Act is to assure, so far as possible, every working man and woman in the nation safe and healthful working conditions and to preserve human resources (29 CFR, Parts 1900-1990, as amended).

The act further provides that each Federal agency has the responsibility to establish and maintain an effective and comprehensive occupational safety and health program that is consistent with national standards. Each agency must:

- Provide safe and healthful conditions and places of employment
- Acquire, maintain, and require use of safety equipment
- Keep records of occupational accidents and illnesses
- Report annually to the Secretary of Labor

Finally, the SARA (42 USC 9601 et seq.) requires the Occupational Safety and Health Administration to issue regulations specifically designed to protect workers engaged in hazardous waste operations. The hazardous waste rules include requirements for hazard communication, medical surveillance, health and safety programs, air monitoring, decontamination, and training.

Executive Order 12898 directs Federal actions to address environmental justice in minority and low-income populations. Each Federal agency must conduct its programs, policies, and activities that substantially affect human health or the environment in a manner that ensures that they do not exclude persons from participation or benefit. Persons will also not be discriminated under such programs, policies, or activities because of their race, color, or national origin.

**Noise**—The Federal Noise Control Act directs all Federal agencies to the fullest extent within their authority to carry out programs within their control in a manner that furthers the promotion of an environment free from noise that jeopardizes the health or welfare of any American (42 USC 4901 et seq.). The act requires a Federal department or agency engaged in any activity resulting in the emission of noise to comply with Federal, state, interstate, and local requirements respecting control and abatement of environmental noise.

**Water Quality**—The objective of the Clean Water Act is to restore and maintain the chemical, physical, and biological integrity of the nation's waters (33 USC 1251 et seq.).

The Clean Water Act prohibits any discharge of pollutants into any public waterway unless authorized by a permit (33 USC 1251 et seq.). Under the Clean Water Act the National Pollutant Discharge Elimination System (NPDES) permit establishes precisely defined requirements for water pollution control.

NPDES permit requirements typically include effluent limitations (numerical limits on the quantity of specific pollutants allowed in the discharge); compliance schedules (abatement

program completion dates); self-monitoring and reporting requirements; and miscellaneous provisions governing modifications, emergencies, etc.

Under the Clean Water Act the EPA is the principal permitting and enforcement agency for NPDES permits. This authority may be delegated to the states.

The Clean Water Act requires all branches of the Federal government involved in an activity that may result in a point-source discharge or runoff of pollution to U.S. waters to comply with applicable Federal, interstate, state, and local requirements.

The Safe Drinking Water Act sets primary drinking water standards for owners or operators of public water systems and seeks to prevent underground injection that can contaminate drinking water sources (42 USC 300f et seq.).

Under the Safe Drinking Water Act, the EPA has adopted National Primary Drinking Water Regulations (40 CFR, Part 141) that define maximum contaminant levels in public water systems. In addition, under the Safe Drinking Water Act the EPA may adopt a regulation that requires the use of a treatment technique in lieu of a maximum contaminant level. The EPA may delegate primary enforcement responsibility for public water systems to a state.

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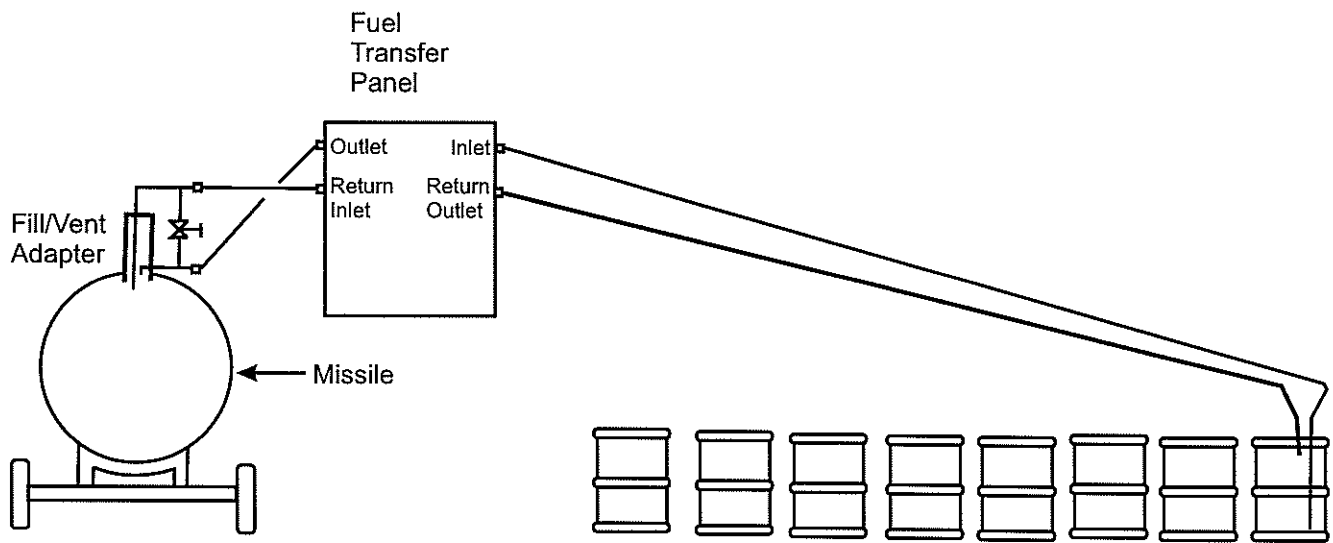
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## Appendix E

### Fuel Fill Schematics

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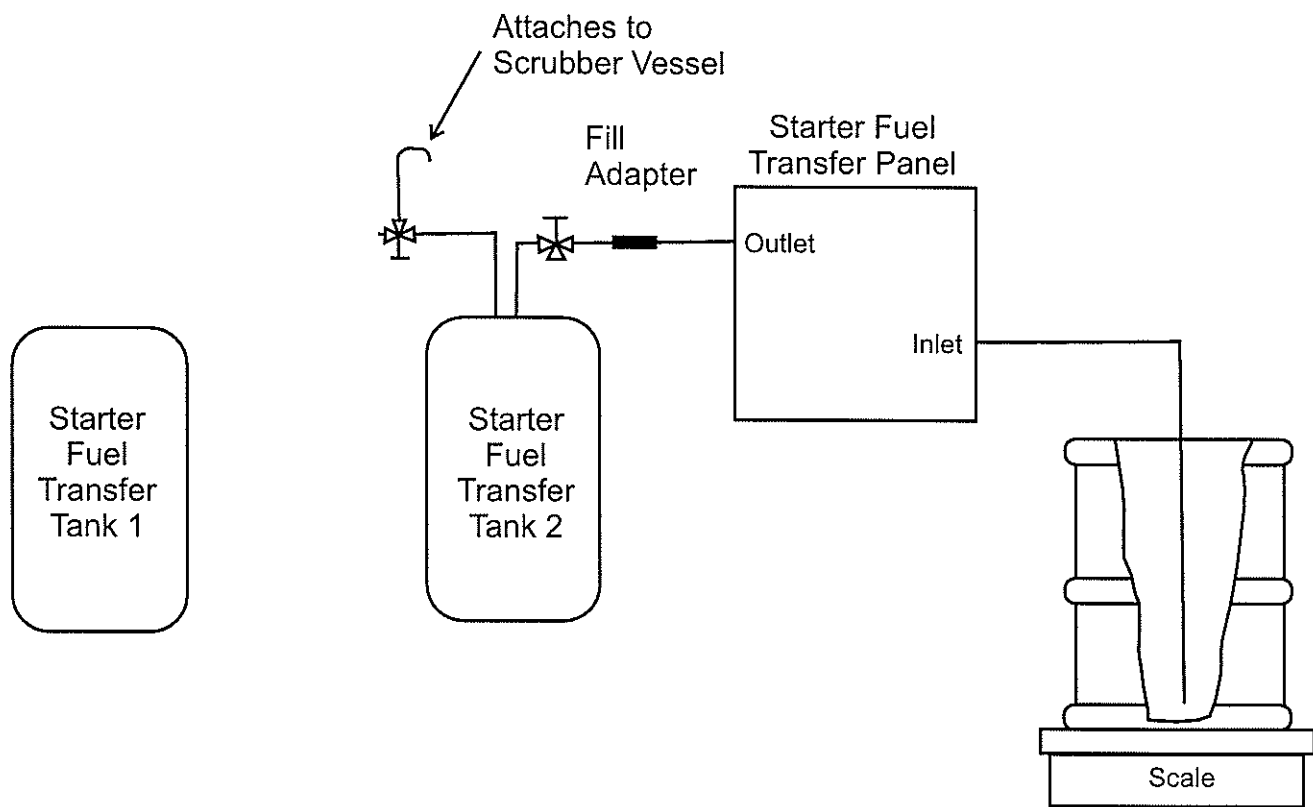
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Source: Lockheed Martin, 1996.

**Main Fuel Fill  
Schematic**

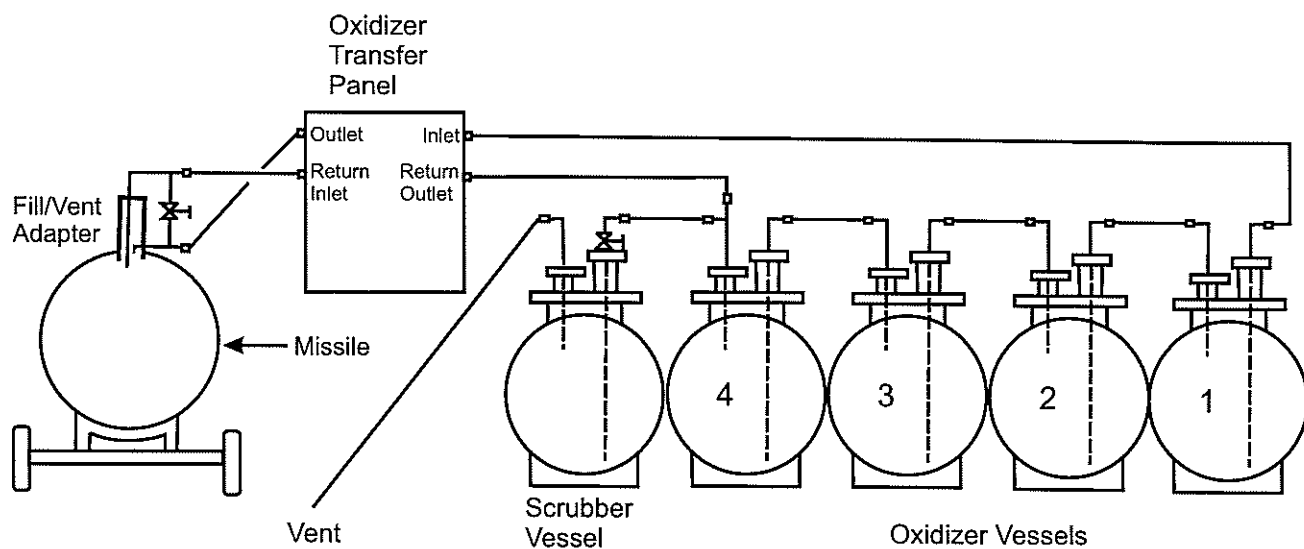
**Figure E-1**



Source: Lockheed Martin, 1996.

**Starter Fuel Fill  
Schematic**

**Figure E-2**



Source: Lockheed Martin, 1996.

**Oxidizer Fill Schematic**

**Figure E-3**